Back

FURUNO

OPERATOR'S MANUAL

COLOR GPS PLOTTER GP-3300
COLOR VIDEO PLOTTER GD-3300

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NISHINOMIYA, JAPAN

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•Your Local Agent/Dealer

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SAFETY INSTRUCTIONS

WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel should work inside the equipment.

Immediately turn off the power at the switchboard if water leaks into the equipment or something is dropped in the equipment.

Continued use of the equipment can cause fire or electrical shock. Contact a FURUNO agent for service.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Do not place liquid-filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Immediately turn off the power at the switchboard if the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock. Contact a FURUNO agent for service.

Make sure no rain or water splash leaks into the equipment.

Fire or electrical shock can result if water leaks in the equipment.

WARNING

Keep heater away from equipment.

A heater can melt the equipment's power cord, which can cause fire or electrical shock.

Use the proper fuse.

Fuse rating is shown on the equipment. Use of a wrong fuse can result in equipment damage.

⚠ CAUTION

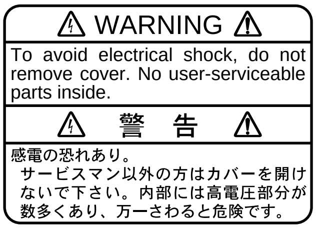
Do not use the equipment for other than its intended purpose.

Use of the equipment as a stepping stool, for example, can result in personal injury or equipment damage.

No one navigation device should ever be solely replied upon for the navigation of a vessel.

Always confirm position against all available aids to navigation, for safety of vessel and crew.

A warning label is attached to the equipment. Do not remove the label. If the label is missing or illegible, contact a FURUNO agent or dealer.



Name: Warning Label (1)
Type: 86-003-1011-0
Code No.: 100-236-230

About the TFT LCD

The TFT LCD is constructed using the latest LCD techniques, and displays 99.99% of its pixels. The remaining 0.01% of the pixels may drop out or blink, however this is not an indication of malfunction.

TABLE OF CONTENTS

FOREWORD vi
MENU TREE viii
SYSTEM CONFIGURATION ix

OPERATIONAL OVERVIEW

1.1 Control Description 1-1
1.2 Inserting Chart Cards 1-2
1.3 Turning the Power On/Off 1-3
1.4 The Trackball 1-4
1.5 The Cursor 1-4
1.6 Shifting the Display 1-5
1.7 Returning Own Ship Marker to Screen Center 1-5
1.8 Selecting Screen Center by Cursor Position 1-6
1.9 Chart Scale 1-7
1.10 Display Brilliance and Key Backlighting 1-7
1.11 Card Drives, Chart Cards 1-8
1.12 The Data Window 1-12
1.13 Display Modes 1-13
1.14 Menu Operation 1-14
1.15 Operation on the Display 1-16
1.16 Operational Status Icons 1-17
1.17 Economy Mode 1-17
1.18 Plot Mode Displays 1-18
1.19 Setting the Time and Date 1-20

TRACK

2.1 Stopping Track Recording 2-1
2.2 Track Color 2-2
2.3 Changing Color, Appearance of Specific Track 2-2
2.4 Deleting Track 2-4
2.5 Track Plotting Interval 2-6
2.6 Customizing the Hold Function 2-8
2.7 Customizing the PLOT INTVL Key 2-9

MARKS, LINES

3.1 Entering Marks 3-1
3.2 Changing Current Mark Color 3-2
3.3 Changing Shape, Color of Specific Marks 3-3
3.4 Deleting Marks 3-4

3.5 External Event Mark 3-5
3.6 Target Mark 3-5
3.7 Lines 3-5

WAYPOINTS

4.1 Entering Waypoints 4-2
4.2 Entering a Comment for a Waypoint 4-5
4.3 Turning Specific Waypoint Displays On/Off 4-6
4.4 Deleting Waypoints 4-7
4.5 Destination Waypoint 4-8
4.6 Cancelling Destination Waypoint 4-12

ROUTE NAVIGATION

5.1 Creating Routes 5-2
5.2 Following a Route 5-5
5.3 Temporarily Deselecting a Route Waypoint 5-6
5.4 Deleting Route Waypoints 5-7
5.5 Cancelling Route Navigation 5-8
5.6 Route Calculation 5-9

ALARMS

6.1 Arrival Alarm, Anchor Watch Alarm 6-1
6.2 XTE Alarm, Border Alarm 6-3
6.3 Ship’s Speed Alarm 6-4
6.4 When the Alarm Buzzer Sounds... 6-5

VIDEO PILOT DISPLAY, NAVIGATION DATA DISPLAY

7.1 Video Pilot Display 7-1
7.2 Navigation Data Display 7-4

AUTOPILOT DATA

8.1 Features Available with Autopilot Connection 8-1
8.2 Autopilot Information on Plot Display 8-2
8.3 Autopilot Information on Video Pilot Display 8-3

MEMORY CARD OPERATIONS

9.1 Formatting Memory Cards 9-1
9.2 Saving Data to Memory Cards 9-2
9.3 Playing Back Memory Cards 9-4
9.4 Saving, Playing Back Initial Settings 9-5
9.5 Editing Memory Cards 9-6

GPS RECEIVER OPERATION (GP-3300)

10.1 GPS Information on the Navigation Data Display 10-1
10.2 GPS and DGPS Initial Settings 10-3
10.3 Satellite Force Health/Deselection 10-5
10.4 GPS Smoothing 10-6
10.5 Cold Start 10-8
10.6 Geodetic Datum 10-9
10.7 Correcting GPS Position 10-9

OTHER FUNCTIONS

11.1 Displaying Position in Loran TDs 11-1
11.2 Bearing Display Reference 11-2
11.3 Magnetic Deviation 11-3
11.4 Changing Chart Appearance 11-4
11.5 Correcting Chart Position 11-5
11.6 Loran TD Correction 11-7
11.7 Calculating R/B Between Two Points 11-8
11.8 Locking Preferred Settings 11-10
11.9 Memory Capacity 11-10
11.10 Apportioning the Memory 11-12
11.11 Reading Number of Track, Marks Used 11-13
11.12 Smoothing 11-14
11.13 Selecting Navaid 11-15
11.14 Track, Mark and Marker Attributes 11-16
11.15 Chart Symbols, Contour Lines Attributes 11-19

MAINTENANCE & TROUBLESHOOTING

12.1 Preventive Maintenance 12-1
12.2 Diagnostic Tests 12-2
12.3 Error Messages 12-5
12.4 Replacement of Fuse 12-7
12.5 Replacement of Batteries 12-8
12.6 Verifying Program Version No. 12-9
12.7 Troubleshooting Table 12-10
12.8 Clearing Memories 12-12

APPENDIX

Time Differences A-1
Geodetic Chart List A-2

SPECIFICATIONS SP-1
INDEX Index-1
Declaration of Conformity

FOREWORD

A Word to FURUNO GD-3300/GP-3300 Owners

FURUNO Electric Company thanks you for considering and purchasing the FURUNO GD-3300/GP-3300. We are confident you will discover why FURUNO has become synonymous with quality and reliability.

For over 40 years FURUNO Electric Company has enjoyed an enviable reputation for efficient and dependable marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

Your unit is designed and manufactured to meet the rigorous demands of the marine environment. However, no machine can perform to the utmost of its ability unless properly operated and maintained. Please carefully read and follow the recommended procedures for operation and maintenance.

We would appreciate hearing from you, the end-user, about whether we are achieving our purposes.

Thank you for considering and purchasing FURUNO.

Features

The GD-3300 and the GP-3300 mostly share the same features. The GP-3300 is additionally equipped with a GPS receiver and a GPS antenna, to receive and process GPS satellite signals.

Navigation data appear on a high-resolution 10.4-inch color LCD. Data shown are shp's position in latitude and longitude, speed and course, cursor position, range and bearing to cursor, range and bearing to a waypoint.

The display unit is powered by a 12 V or 24 VDC power supply.

- GP-3300 accepts connection of DGPS Beacon Receiver
- NAVIONICS chart card compatible
- Alarms: Arrival alarm, Anchor Watch alarm, Cross-track Error alarm, Border alarm, Ship's Speed alarm
- Large capacity memory: 8,000 points of tracks and marks, 98 waypoints, 10 routes with 15 waypoints per route
- Comprehensive navigation display of alphanumeric navigation data plus automatic track plotting
- Economy mode reduces power consumption – LCD is turned off while receiver/processor keeps updating data.
- Factory-digitized electronic charts on ROM cards.
- Memory cards for storage of track, waypoints, marks
- Menu-driven operation
- Navigation planning from/to waypoint or route

MENU TREE

MENU

- 1 WAYPOINT
- 2 ROUTE
- 3 SAVE DATA TO MEMORY CARD
  - 1 TRACK
  - 2 MARK/LINE
  - 3 WAYPOINT/ROUTE
  - 4 INITIAL SETTINGS
  - 7 DELETE MEMORY CARD DATA
  - 8 FORMAT MEMORY CARD
  - 9 SELECT CARD SLOT
    (1 UPPER 2 LOWER)
- 4 LOAD MEMORY CARD
  - 1 TRACK
  - 2 MARK/LINE
  - 3 WAYPOINT/ROUTE
  - 4 INITIAL SETTINGS
  - 9 SELECT CARD SLOT
    (1 UPPER 2 LOWER)
- 5 DISPLAY MEMORY CARD
- 6 CORRECT POSITION
- 7 APPORTION/DELETE MEMORY
  - 1 APPORTION MEMORY
  - 2 DELETE TRACK
  - 3 DELETE MARK
- 8 INITIAL SETTINGS (See below.)
- 9 MISC
  - 1 EDIT TRACK/MARK
  - 2 CALCULATE RANGE/BEARING
  - 6 SPECIAL
  - 7 SELECT MARKS/ CONTOUR LINE
  - 8 CLEAR MEMORY
    - 1 CLEAR SCREEN DATA
    - 2 CLEAR ALL GD DATA
    - 3 CLEAR GPS DATA
    - 4 CLEAR ALL DATA
  - 9 SELF TEST
    - 1 MEMORY • I/O PORT
    - 2 KEYBOARD
    - 3 TEST PATTERN 1
    - 4 TEST PATTERN 2

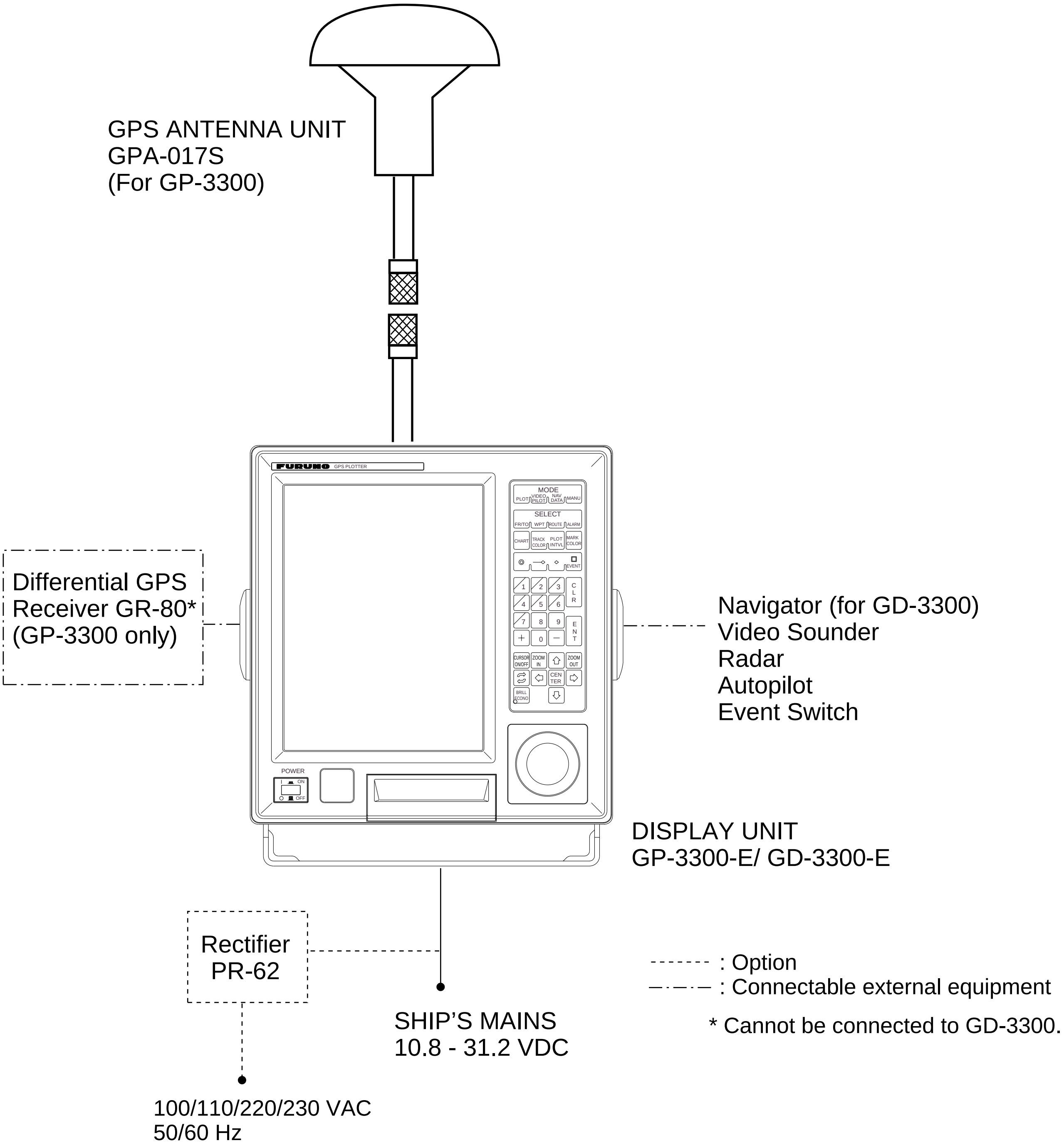
INITIAL SETTINGS, page 1

INTERNAL NAV
EXTERNAL NAV
I/O DATA FORMAT
L/L SMOOTHING
PLOT INTERVAL 1
PLOT INTERVAL 2
WAYPOINT MARK
EVENT MARK
TRACK(HOLD PLOT)
LINE (HOLD PLOT)
MAGNETIC DEVIATION
BEARING
COURSE VECTOR
MARK SIZE
CURSOR SIZE
OWN SHIP MARK
TRACK WIDTH
RANGE UNIT
VTD AVG TIME
DATE
TIME
EXTERNAL CLOCK
AUTOPILOT DISPLAY
TD INDICATION

INITIAL SETTINGS, page 2 (GPS settings)

POSITION FIXING MODE
GEODETIC DATUM
HDOP THRESHOLD
TIME DIFFERENCE
LATITUDE
LONGITUDE
DELTA LATITUDE
DELTA LONGITUDE
SMOOTHING
ANTENNA HEIGHT
COLD START
CST SATELLITE NO.
MIN. ELEVATION ANGLE
DESELECT SAT NO.
D.GPS MODE
RTCM VER
BYTE FORM
FIRST BIT
PARITY BIT
STOP BIT
BIT RATE
BAUD RATES

SYSTEM CONFIGURATION



OPERATIONAL OVERVIEW

This chapter acquaints you with the basics of your unit – from turning on the power to entering the time and date.

1.1 Control Description

The keyboard consists of 40 logically arranged keys. The unit confirms correct key input by releasing a single beep. Invalid key input is denoted by a series of beeps.

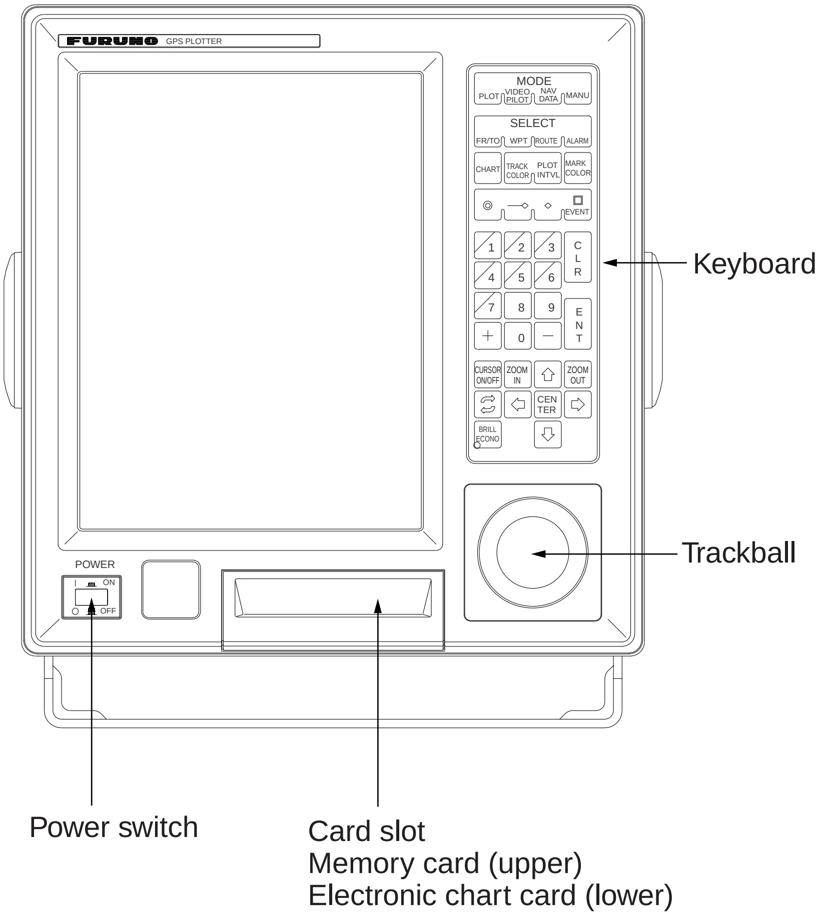
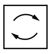


Figure 1-1 Display unit

Table 1-1 Control description

Key/Control	Function
PLOT	Selects plot display. Also functions to turn on/off data displays.
VIDEO PILOT	Selects video pilot display. Also functions to turn on/off data displays.
NAV DATA	Selects navigation data display.
MENU	Opens/closes menu; displays previous screen.
FR/TO	Sets/cancels destination waypoint.
WPT	Registers waypoints.
ROUTE	Registers routes.
ALARM	Displays alarm menu.
CHART	Changes attributes of factory-digitized electronic chart.
TRACK COLOR	Changes track color.
PLOT INTVL	Each press selects a plot interval or stops recording track.
MARK COLOR	Changes mark color.
MARK Keys and EVENT	Enters mark/line. (EVENT: Outputs ship's position to navigator when pressed.)
Numeric Keys	Enter numeric data.
CLR	Clears an entire line of data; deletes mark or waypoint; silences audible alarm.
ENT	Terminates keyboard input.
[+]	Changes latitude coordinate to North or East; turns on waypoint display; selects route points.
[-]	Changes longitude coordinate to South or West; turns off waypoint display; deselects route points.
CURSOR ON/OFF	Turns cursor on/off.
ZOOM IN ZOOM OUT	Change chart scale.
	Changes position indication method (L/L or Loran TDs); scrolls page. **Note:** This key appears on menu displays as "Change key."
CENTER	Returns own ship marker/cursor to screen center.
Arrow Keys	Shift display and cursor.
BRILL ECONO	Adjusts screen brilliance and keyboard backlighting. Also functions to turn on/off the economy mode (press and hold down until the LCD turns off).

1.2 Inserting Chart Cards

Normally, insert appropriate chart card before turning on the power.

1. Open the card drive cover.

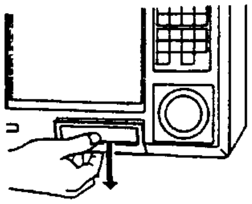


Figure 1-2 Opening chart slot

2. Insert the electronic chart card which contains a chart of your sea area into the lower card drive.

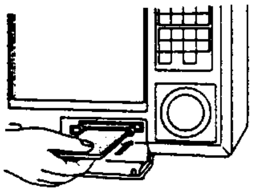


Figure 1-3 Inserting chart card

Note: *Always close the card drive cover to keep humidity and water out of the drive.*

1.3 Turning the Power On/Off

Turning the power on

Press the [POWER] switch at bottom left-hand side of the unit. You will hear a “peep” when turning on the power. To turn off the power press the switch again.

After turning on the power the display changes in the sequence illustrated in Figure 1-4. About 20 seconds later accurate own ship’s position is displayed in case of the GP-3300.

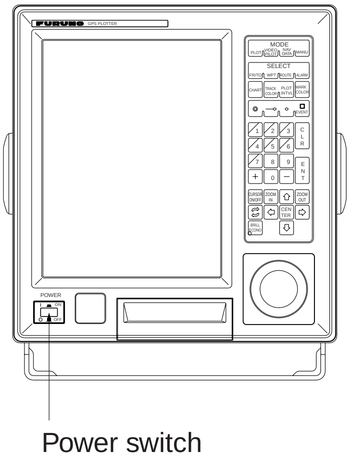
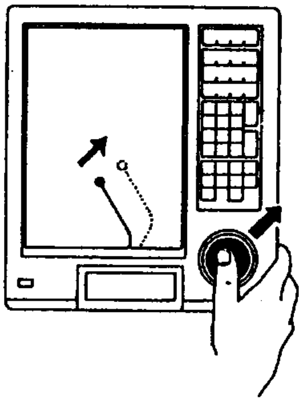


Figure 1-4 GD-3300/GP-3300

For the GP-3300, at the first power application after installation, it takes about two minutes to acquire GPS satellite data, called the almanac. While the unit is acquiring the almanac, the indication “CST” appears at the top of the display. “CST” is replaced by “2D” or “ACQ” after the almanac is acquired. If the vessel has moved more than 600 miles with the system turned off, reenter estimated position on the GPS INITIAL SETTINGS menu (key sequence: [MENU], [8], [↑]).

If asterisks appear instead of ship’s position data, this means there is no navigation input. Check to make sure proper navigation aid is selected on the INITIAL SETTINGS menu (keying sequence: [MENU], [8]).

1.4 The Trackball



The main function of the trackball is to shift the cursor and the display. The display may be shifted when the cursor is turned off; the cursor when it is turned on.

Figure 1-5 Operating the trackball, shifting the picture (cursor off)

1.5 The Cursor

The cursor functions to

- Find latitude and longitude of a location
- Find range and bearing from your ship to position selected
- Enter and erase marks, lines and waypoints

Note: You can select cursor configuration (cross hairs or entire screen cursor) on the INITIAL SETTINGS menu (keying sequence: [MENU], [8]). The default cursor configuration is the cross hairs.

Turning the cursor on/off

Each press of the [CURSOR ON/OFF] key turns the cursor on/off.

With the cursor on, operate the trackball or the arrow keys to shift the cursor. Use the trackball for general placement and the arrow keys for fine tuning. The cursor moves in the direction of the trackball moves. When the cursor reaches the edge of the display, the display shifts in the opposite direction.

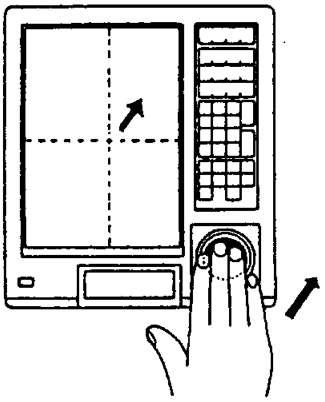


Figure 1-6 Shifting the cursor

Cursor information

Cursor position in latitude and longitude and the range and bearing from your ship to the cursor appear in the data window at the top of the display.

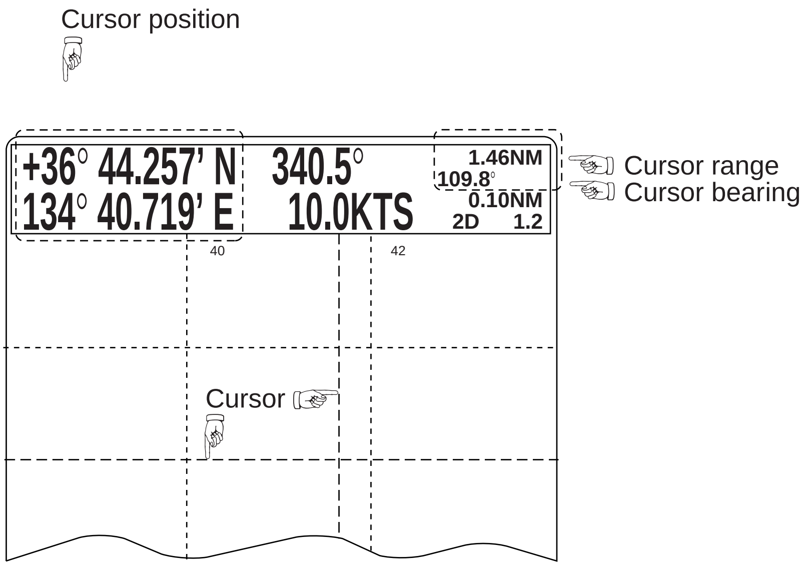


Figure 1-7 Location of cursor information

1.6 Shifting the Display

The display can be shifted, when the cursor is off, by the trackball or arrow keys. The display shifts in the direction of trackball rotation or arrow key pressed. Note that this function is only available with FURUNO chart cards.

1.7 Returning Own Ship Marker to Screen Center

You can return the own ship marker to the screen center by pressing the [CENTER] key. This function is only available with FURUNO chart cards.

1.8 Selecting Screen Center by Cursor Position

In normal usage your ship is at the screen center. This function is only available with FURUNO chart cards.

If you want to select a land feature as the screen center, do the following:

1. Display the cursor (if it is not already displayed) by pressing the [CURSOR ON/OFF] key.
2. Operate the trackball to place cursor on position desired.
3. Press the [CENTER] key.

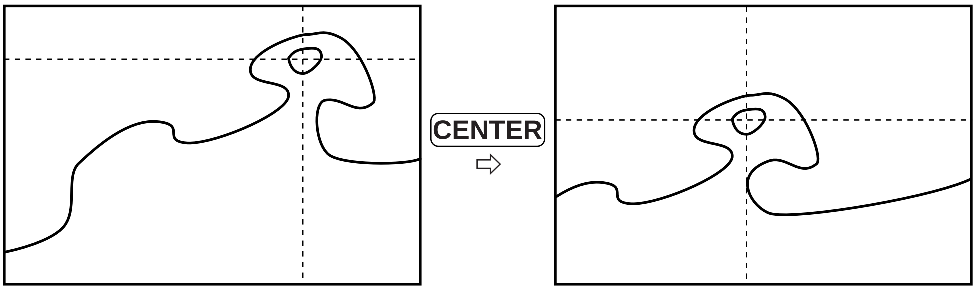


Figure 1-8 How to select screen center

1.9 Chart Scale

The chart scale can be adjusted with the [ZOOM IN] and [ZOOM OUT] keys. Note that the [ZOOM IN] key shrinks the picture, and the [ZOOM OUT] key “blows up” the picture. With a smaller range, you may find that the track appears in tiers.

The horizontal range of the display in nautical miles appears at the top right-hand corner of the Data Display. Whenever the scale is changed the new range appears momentarily at the screen center.

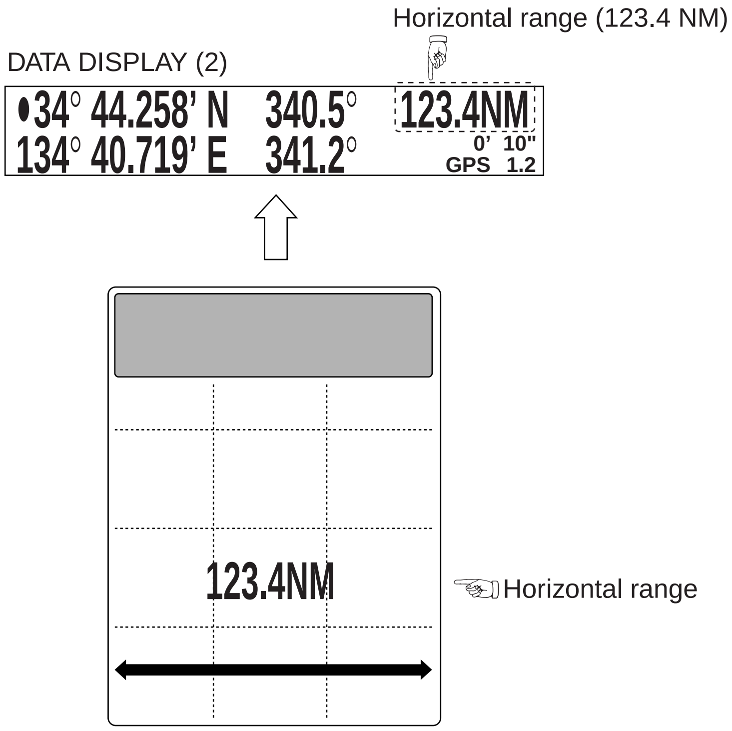


Figure 1-9 Location of chart scale indications

1.10 Display Brilliance and Key Backlighting

The [BRILL ECONO] key adjusts display screen brilliance and keyboard backlighting in seven levels including off.

1.11 Card Drives, Chart Cards

Card drives

Two card drives are behind the card drive door: the upper slot is for memory cards which store display data (waypoints, tracks, and marks), and the lower slot is for digitized chart cards.

Displaying an electronic chart with the power turned on

Follow the procedure below to display an electronic chart with the power turned on.

1. Open the card slot door.

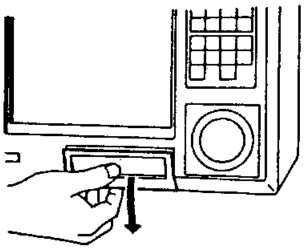


Figure 1-10 Opening card slot door

2. Insert chart card label side up in the lower slot.

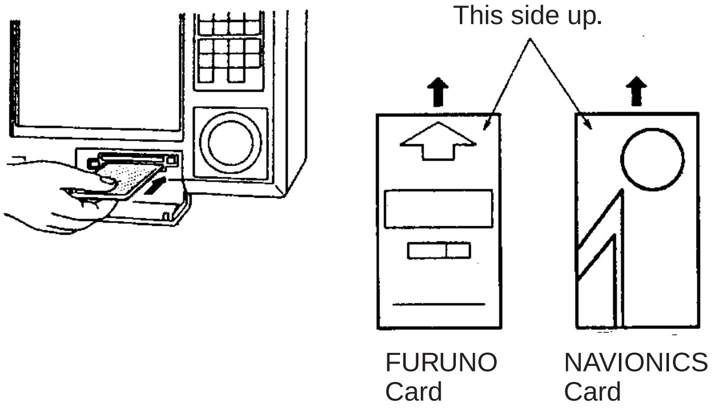


Figure 1-11 Inserting chart card

3. Close the card slot door.
4. Press [ZOOM IN] or [ZOOM OUT] key to display chart.

Ejecting the chart card

Press the eject button.

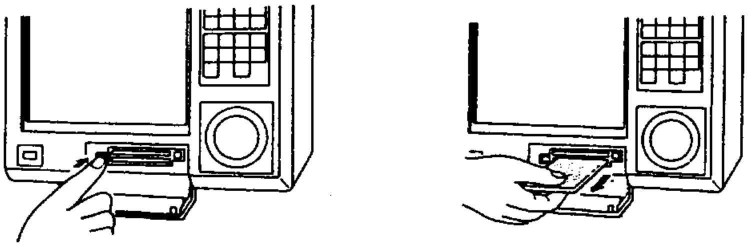


Figure 1-12 Removing chart card

Care and handling of the cards

- Keep the cards away from direct sunlight, heat sources, and active gases.
- Keep cards away from water and chemicals.
- Keep the connector free of foreign material.
- Do not drop the cards.

Chart card troubleshooting

- Chart does not disappear after removing card.

  Operate [ZOOM IN] or [ZOOM OUT] key.
- Card inserted but chart does not appear.

  Operate [ZOOM IN] and [ZOOM OUT] keys.
- Small island or object is not filled in (it is hollow).

  Operate [ZOOM IN] and [ZOOM OUT] keys.
- Part of land on video pilot display is hollow.

  Shift display.
- Land areas on a chart are hollow.

  Chart overenlarged. Operate [ZOOM IN] key.

Chart icons

The display shows three different icons to alert the operator to chart status. These are as described in Table 1-2.

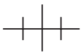
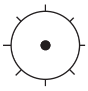
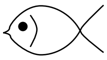
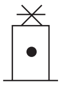
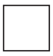
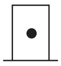
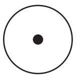
Table 1-2 Chart icons

Icon	Reason Displayed	Remedy
	• Card is not inserted properly. • Chart scale is too small.	• Insert card. • Enlarge chart by [ZOOM IN] key.
	• This icon means the chart is displayed properly; full chart reliability.	
	• This icon means poor chart reliability because chart is overenlarged.	Use chart with extreme caution. Shrink chart by [ZOOM OUT] key.

FURUNO chart symbols

The table below shows FURUNO chart symbols and their meanings.

Table 1-3 FURUNO chart symbols

Symbol	Description	Symbol	Description
	Summit		Position of Sounding
	Wreck		Obstruction
	Lighthouse		Fishing Reef
	Lighted Buoy		Platform
	Buoy		Anchorage
	Radio Station		

Comparison of FURUNO, NAVIONICS chart cards

Table 1-4 Comparison of FURUNO, NAVIONICS chart cards

Item	FURUNO	NAVIONICS
Dot scrolling capability	YES	NO (only 256 dots can be scrolled at once)
Course-up display	YES	NO
Lighthouse, buoy data presentation	NO	YES
Zoom at cursor position	YES	*1
Range at Equator	1, 1.5, 2, 3, 4, 6, 8, 12...8192 nm	0.125, 0.25, 0.5, 1, 2, 4, 8...1024 nm
Chart offset data entry	YES	NO
Centering	YES	*2

*1: The cursor may not be centered.
*2: The own ship position may not be centered perfectly.

Buoy, lighthouse data display on NAVIONICS charts

NAVIONICS chart cards can show buoy and lighthouse data.

1. Insert a NAVIONICS chart card in the lower slot. Buoys and lighthouses are shown on the chart as in the figure below.

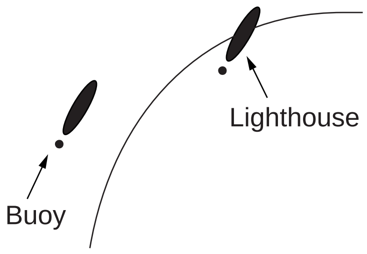


Figure 1-13 Appearance of lighthouse and buoy on Navionics chart

2. Place the cursor on a buoy or lighthouse mark to display data about that mark.

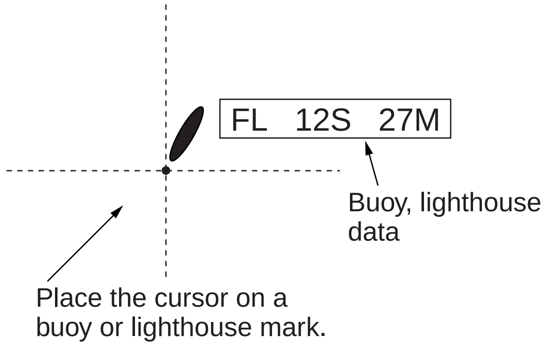


Figure 1-14 Buoy, lighthouse data

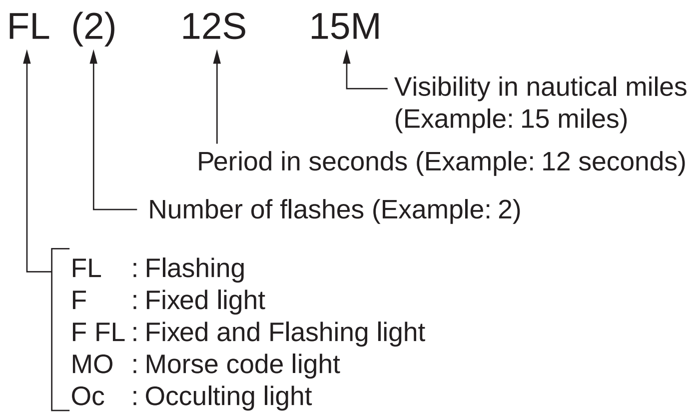


Figure 1-15 How to interpret buoy, lighthouse data

1.12 The Data Window

The data window at the top of the display shows various navigation information. What information is displayed depends on whether the cursor is on or off and the status of the [PLOT] key or [VIDEO PILOT] key. Figures 1-16 and 1-17 show what appears in the data window under those conditions.

Data shown when cursor is on

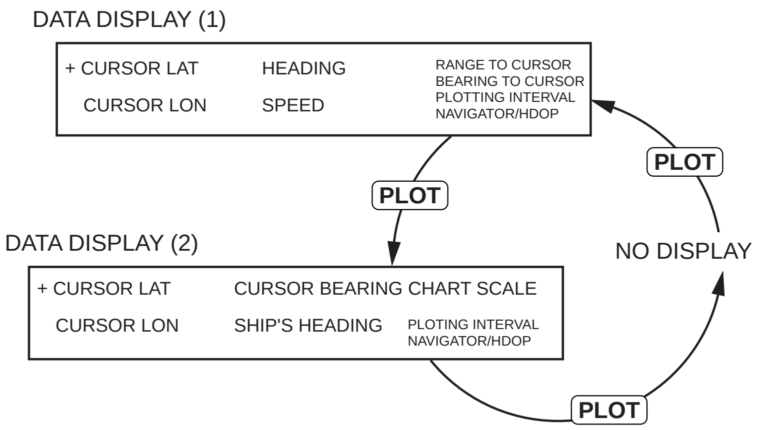


Figure 1-16 Information displayed in data window when cursor is on

Data shown when cursor is off

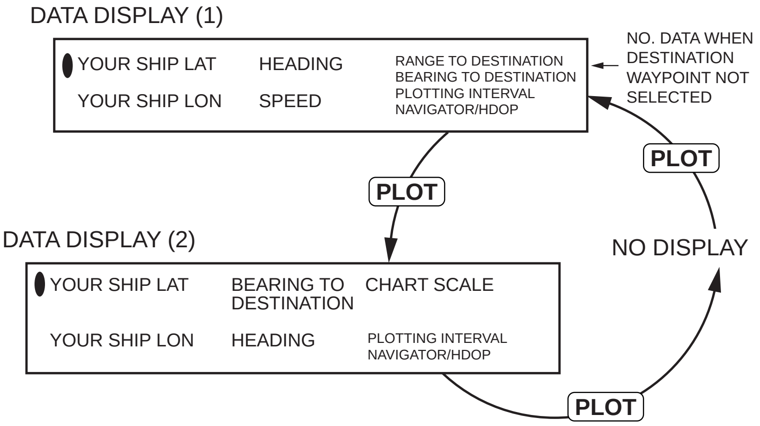


Figure 1-17 Information displayed in data window when cursor is off

1.13 Display Modes

Your plotter has three display modes: Plot, Video Pilot, and Navigation Data. You may select those modes with the [PLOT], [VIDEO PILOT], and [NAV DATA] keys, respectively.

Plot mode description

This mode provides general positioning information and shows

- latitude and longitude grid
- own ship mark
- factory-digitized chart
- ship's track
- marks, and
- waypoints.

Video pilot mode description

The video pilot mode provides ship piloting information and features the following.

- Own ship mark is triangle shaped and shows bow bearing.
- Grid shows distance in nautical miles from own ship.
- Course up display
- ETA and TTG to waypoint

Nav data mode description

This display shows navigation data such as

- Speed
- Course
- Data from external sensors (water temperature, depth, etc.)
- Position, and
- GPS satellite information (GP-3300 only).

1.14 Menu Operation

Menu operation versus key operation

Many functions of your plotter can be executed through the menu or by pressing the key associated with function desired. For example, you can enter a waypoint by pressing the [WPT] key, or [MENU] and [1].

To display the menu, press the [MENU] key to display the Main menu. To select a menu, press appropriate numeric key.

MENU
1 WAYPOINT 2 ROUTE 3 SAVE DATA TO MEMORY CARD 4 LOAD MEMORY CARD 5 DISPLAY MEMORY CARD 6 CORRECT POSITION 7 APPORTION/DELETE MEMORY 8 INITIAL SETTINGS 9 MISC
SELECT BY USING NUMBER KEY.

Figure 1-18 Main menu

Main menu description

Table 1-5 Main menu description

Menu No.	Menu	Function
1	WAYPOINT	Registers waypoint by latitude and longitude; edits/deletes waypoint, displays waypoint list.
2	ROUTE	Displays route list.
3	SAVE DATA TO MEMORY CARD	Saves desired display component to memory card. 1. TRACK: Save track. 2. MARK/LINE: Save marks/lines. 3. WAYPOINT/ROUTE: Save waypoint/route. 4. INITIAL SETTINGS: Save initial settings. 7. DELETE MEMORY CARD DATA: Delete file on memory card. 8. FORMAT MEMORY CARD: Prepare memory card for use with system. 9. SELECT CARD SLOT: Select memory card slot to use.
4	LOAD MEMORY CARD	Loads memory card. 1. TRACK: Loads track. 2. MARK/LINE: Loads marks/lines. 3. WAYPOINT/ROUTE: Loads waypoints/routes. 4. INITIAL SETTINGS: Load initial settings. 9. SELECT CARD SLOT: Selects memory card slot to use.
5	DISPLAY MEMORY CARD	Plays back memory card. (Note that display is not cleared.)
6	CORRECT POSITION	Corrects chart position error.
7	APPORTION/DELETE MEMORY	Apportions deletes memory. 1. APPORTION MEMORY: Apportions memory between track and marks. Total capacity for marks and track is 8,000 points. 2. DELETE TRACK: Deletes all track. 3. DELETE MARK: Deletes all marks.
8	INITIAL SETTINGS	Displays INITIAL SETTINGS menu.
9	MISC	1. EDIT TRACK/MARK: Edit, delete track/marks. 2. CALCULATE RANGE/BEARING: Calculates range and bearing between two points. 6. SPECIAL 1) TIME MARK: Turns time mark on or off. 2) EVENT MARK WINDOW: Turns mark infomation window on video pilot display on/off. 3) ROUTE LINE: Connects/disconnects route waypoints. 4) SCREEN SCALE: Selects chart scale for distance or scale. 5) AP DATA FORMAT: Selects autopilot data format. 7. SELECT MARKS/CONTOUR LINE: Selects color of chart marks and contours lines and turn them on/off. 8. CLEAR MEMORY 1) CLEAR SCREEN DATA: Clears current display. 2) CLEAR ALL GD DATA: Clears GD data. 3) CLEAR GPS DATA: Clears GPS receiver data (GP-3300 only). only). 4) CLEAR ALL DATA: Clears both GD and GPS data (GP-3300 only). 9. SELF TEST 1) MEMORY/I/O PORT: Checks memories and I/O ports. 2) KEYBOARD: Tests keyboard. 3) TEST PATTERN 1: Tests for color dropout. 4) TEST PATTERN 2: Tests for color destortion.

1.15 Operation on the Display

Selecting items

As you move the item selection cursor (red triangle) down through a menu by pressing [↑]/[↓], the option selection cursor, initially colored in light-blue, changes to red. This indicates current selection for line selected.

Selecting options

To select options;

1. Press [↑]/[↓] to place the item selection cursor on the item you want to change.
2. Press [←]/[→] to place the option selection cursor on the option desired.

Entering data

The reverse video “square” on the display is the data input cursor. Press [←]/[→] to locate the cursor where you want to enter data, and then enter appropriate data with the numeric keys. The entry of the leading zero is necessary, but the entry of trailing zeroes is optional. For example, if you want to enter 7, press [0] and [7].

Summary of menu operation

Figure 1-19 shows how to select items and options on the DESTINATION SETTING menu, which appears by pressing the [FR/TO] key.

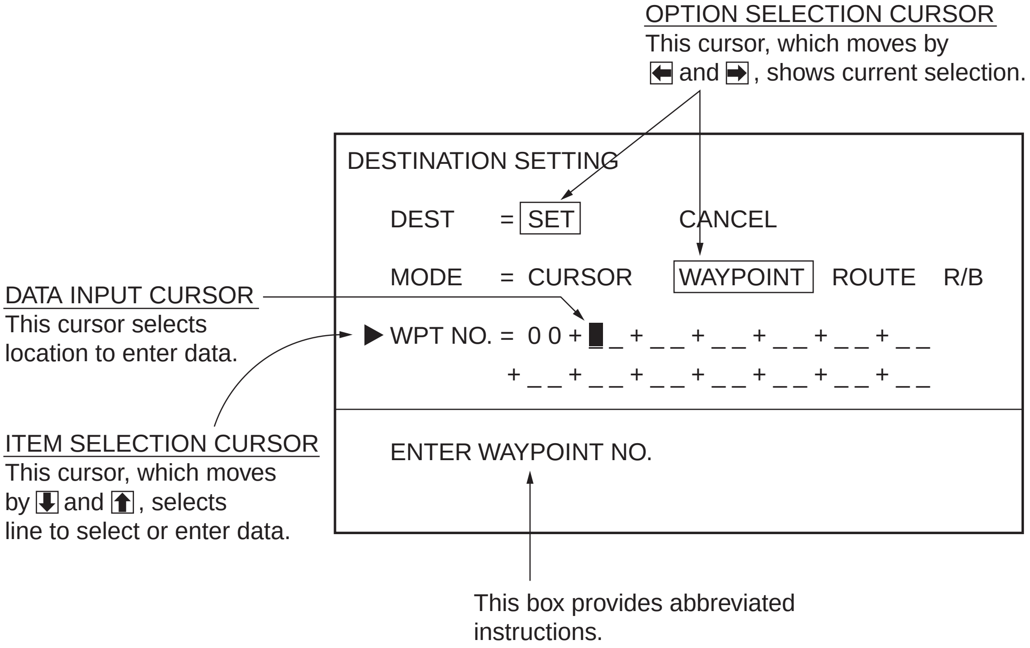
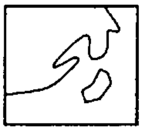
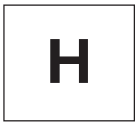
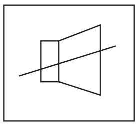
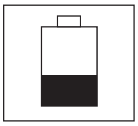
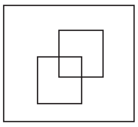
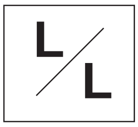


Figure 1-19 DESTINATION SETTING menu

1.16 Operational Status Icons

Various icons at the bottom right-hand corner of the display to alert the operator to operational status. Table 1-6 explains the meanings of these icons.

Table 1-6 Operational status icons

Chart data reliable.	 Chart overenlarged; chart data may be unreliable.
 Track recording turned off (track hold).	Chart overenlarged or wrong chart.
 Alarm violation. Icon disappears when alarm is disengaged or cause of alarm is removed.	 Low voltage of memory card battery or battery on GDC Board; replace battery at earliest convenience.
 Chart position offset applied on CORRECT POSITION menu.	 L/L position offset applied on GPS INITIAL SETTINGS menu (GP-3300 only).

1.17 Economy Mode

The economy mode turns off the LCD to lessen power consumption (GD-3300: 13 W → 6W, GP-3300: 15 W → 8W). The track is continually recorded and plotted. To turn the economy mode on press and hold down the [BRILL ECONO] key about three seconds. The lamp on the key lights when the economy mode is on. To turn off the economy mode, press the key again.

1.18 Plot Mode Displays

Information displayed on the plot display depends on whether the cursor is on or off. Figures 1-20 and 1-21 show sample plot displays with the cursor on and off, respectively.

Plot display when cursor is on

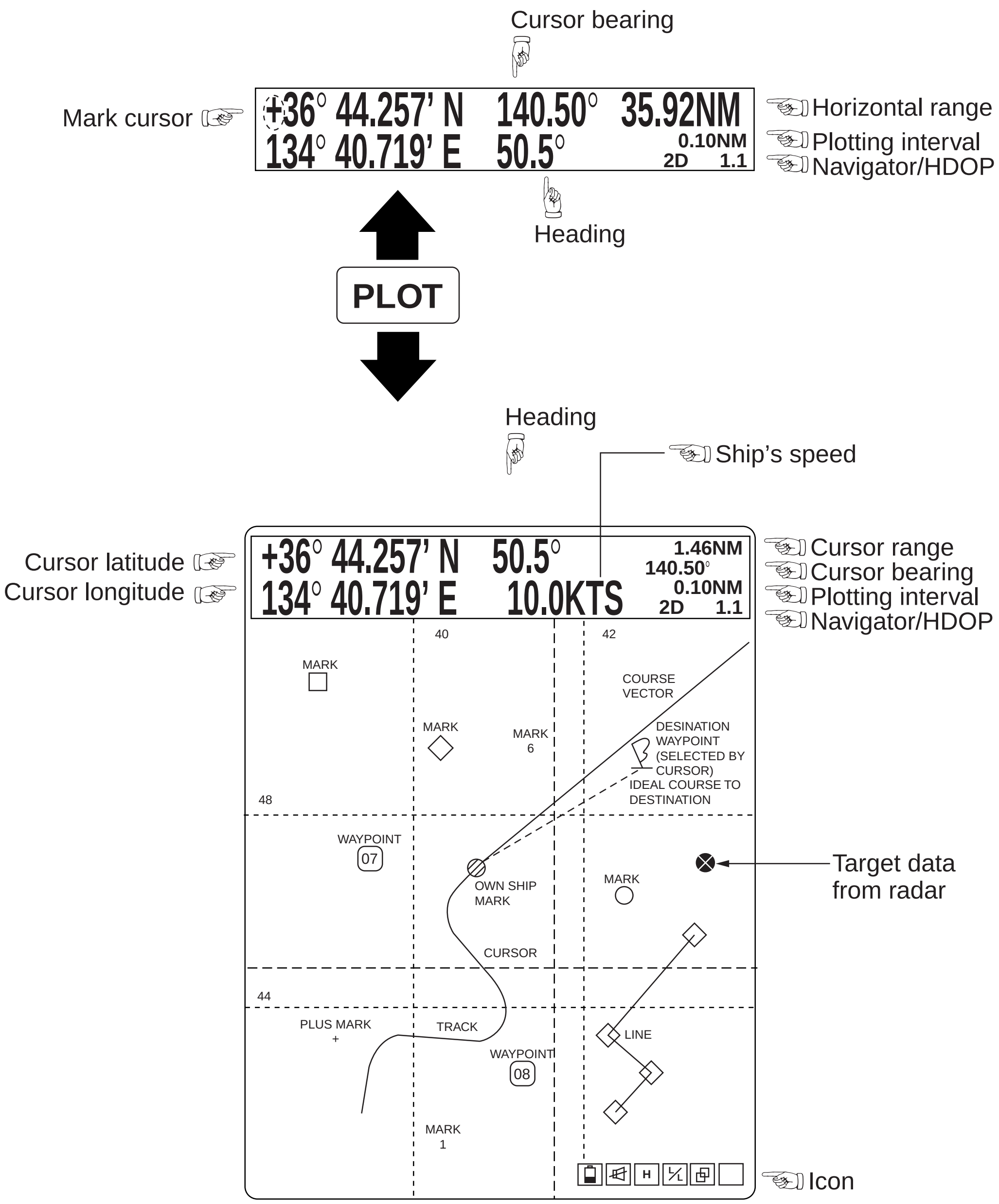


Figure 1-20 Plot display, cursor on

Plot display when cursor is off

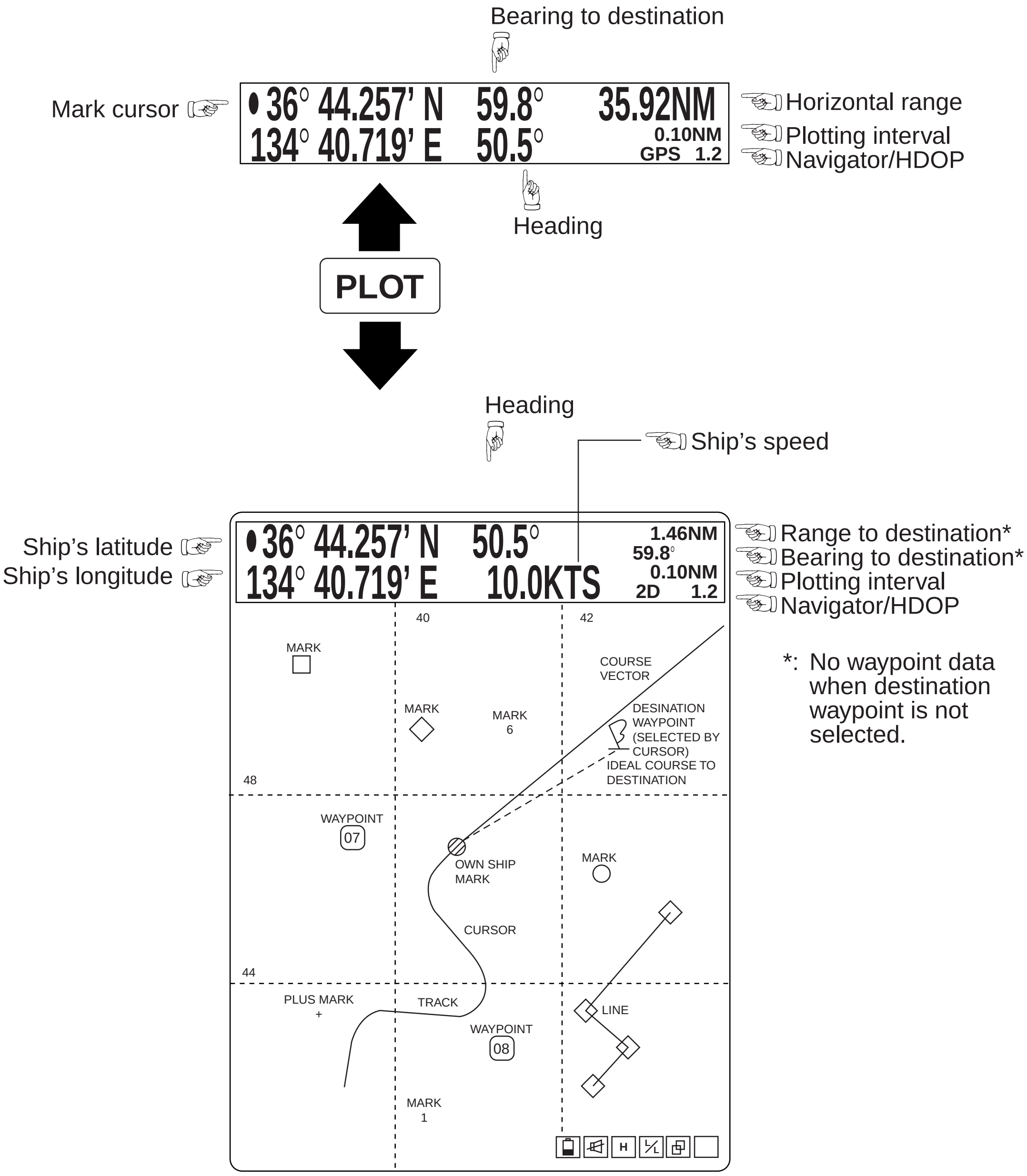


Figure 1-21 Plot display, cursor off

1.19 Setting the Time and Date

The internal clock marks time and is used to perform navigation calculations (for example, time-to-go). Set the clock and the date as follows:

1. Press the [MENU] key.
2. Press the [8] key to display the INITIAL SETTINGS menu.

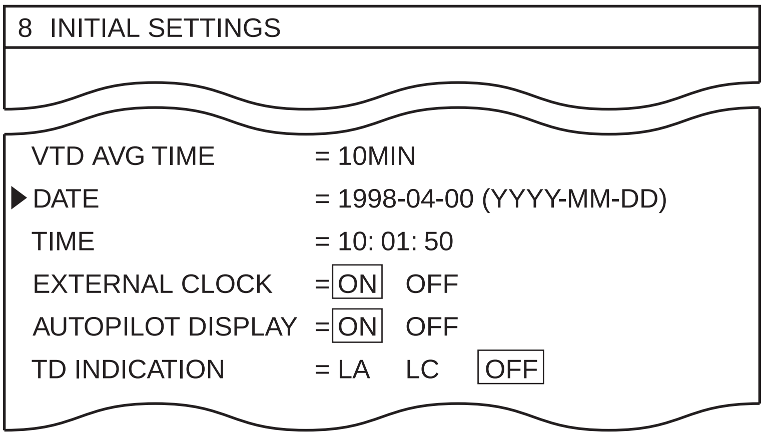


Figure 1-22 INITIAL SETTINGS menu

3. Select DATE.
4. Enter date; year, month and day in that order. Enter year in four digits and month and day in two each. To enter April 10, 1998, for example, press [1], [9], [9], [8], [0], [4], [1], [0].
5. Select TIME.
6. Enter hour, minute and seconds in two digits each. To enter 18:30, for example, press [1], [8], [3], [0], [0], [0].
7. Press the [ENT] key.

Note: The time on the navigation data display is updated continually by the internal clock but the time display on the INITIAL SETTINGS menu is not updated.

TRACK

2.1 Stopping Track Recording

When your ship is at anchor or returning to port you probably will not need to record the track. You can stop recording the track, to conserve the track memory, by activating the “hold” function. The track is displayed but not recorded, thereby conserving the track memory.

Press the [PLOT INTVL] key to display HOLD. The indications “HOLD” and “H” appear on the display. The track is traced on the display but is not stored. To resume plotting press the key again. “HOLD” and “H” disappear.

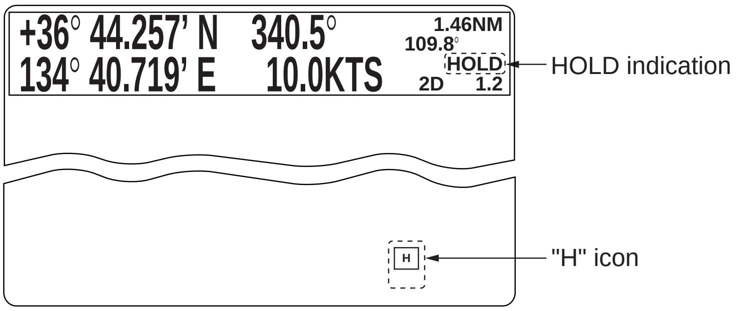


Figure 2-1 Location of “HOLD” indication

When the display is redrawn (by operating the [ZOOM IN], [ZOOM OUT] keys, for example) the track is not traced while a control is operated. When a control is released a line connects between position when control was operated and position when control was released.

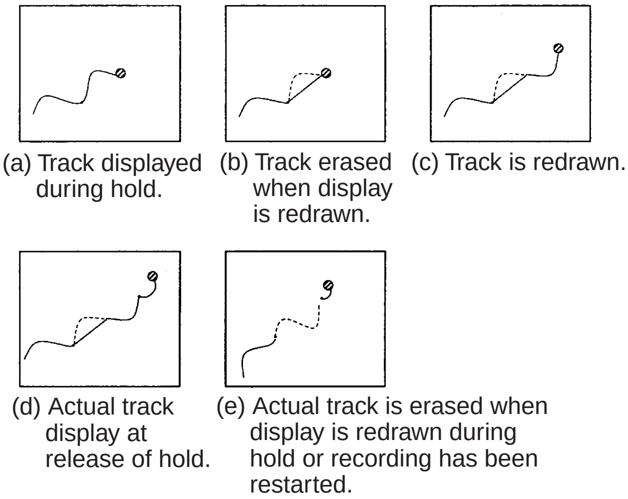


Figure 2-2 Track state and hold on/off

2.2 Track Color

The default track color is red, but you may change track color to any one of seven colors. It is useful to change track color when returning to port, changing course, etc.

1. Press the [TRACK COLOR] key to display the CHANGE TRACK COLOR menu.

```
CHANGE TRACK COLOR
  ▶ TRK COLOR = [1]  2  3  4  5  6  7

    SELECT TRACK COLOR BY NUMBER.
    — : DELETE TRACK
```

Figure 2-3 CHANGE TRACK COLOR menu

2. Press appropriate numeric key among 1 to 7 to select color: [1], Red; [2], Yellow; [3], Green; [4], Light-blue; [5] Purple; [6], Blue, [7] White.

2.3 Changing Color, Appearance of Specific Track

You may wish to change the color and appearance of specific track. This is useful for showing course change location, etc.

For example, change the color of track section AB to yellow and line type to dashed line.

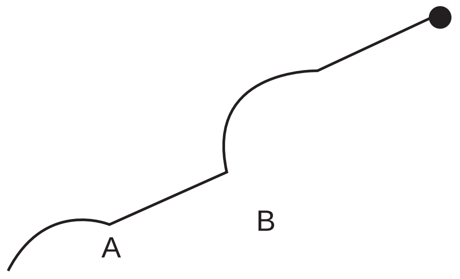


Figure 2-4 Track

1. Press [MENU], [9] and [1] to display the EDIT/TRACK MARK menu.

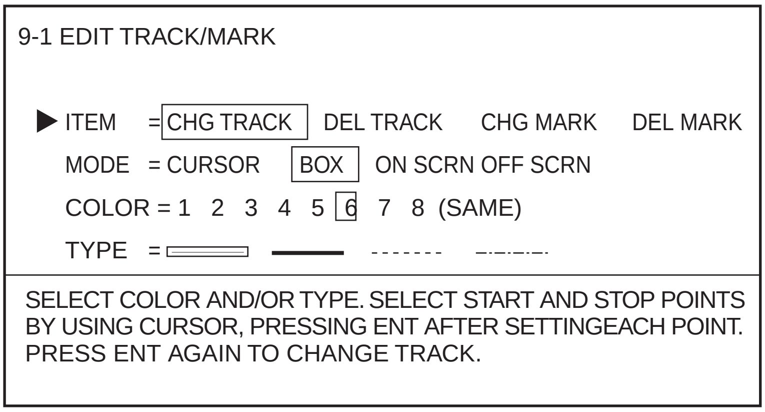


Figure 2-5 EDIT/TRACK MARK menu

2. Select CHG TRACK from the ITEM field.

3. Select method of change from the MODE field.
   CURSOR: Select the track to edit with the crosshair cursor.
   BOX: Circumscribe the track to edit with the box cursor.
   ON SCRN: Edit all track displayed on the screen.
   OFF SCRN: Edit track stored in memory.

4. Select the COLOR field.

5. Select new color. Using the above example, press the [2] key.

6. Select the TYPE field.

7. Select track type desired. Using the example, select the dashed line.

8. For CURSOR or BOX select start point.

9. Press the [ENT] key.

10. For CURSOR or BOX select stop point.

11. Press the [ENT] key.

12. Press the [ENT] key again.

2.4 Deleting Track

Deleting track by color

One method of deleting unwanted track is by specifying track color. Deleted track cannot be restored – exercise caution when deleting track.

1. Press the [TRACK COLOR] key to display the CHANGE TRACK COLOR menu.

```
CHANGE TRACK COLOR
  ▶ TRK COLOR = [1]  2  3  4  5  6  7

    SELECT TRACK COLOR BY NUMBER.
    — : DELETE TRACK
```

Figure 2-6 CHANGE TRACK COLOR menu

2. Press [-], and then press a numeric key among 1 - 7 to select color to delete. If you want to delete all yellow color track, for example, press [-] and [2].

Deleting specific track with cursor, box cursor

You may delete unnecessary portions of ship's track with the cursor or box cursor. For example, if you wanted to delete the track from point A to point B in the figure below, you would do the following:

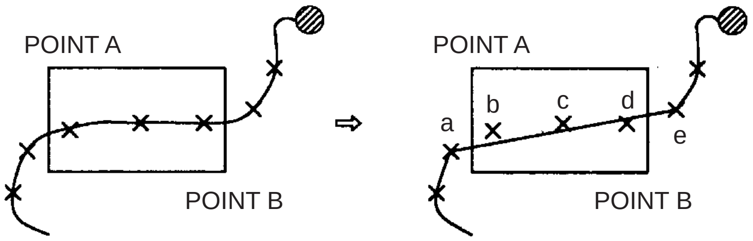


Figure 2-7 Track

1. Press [MENU], [9], [1] to display the EDIT/TRACK menu.

```
9-1 EDIT TRACK/MARK

  ▶ ITEM   = CHG TRACK [DEL TRACK] CHG MARK  DEL MARK
    MODE  = CURSOR [BOX]  ON SCRN   OFF SCRN

SET BOX SIZE USING CURSOR, PRESSING ENT AT
TWO CORNERS.
PRESS ENT AGAIN TO DELETE TRACK.
```

Figure 2-8 EDIT/TRACK menu

2. Select DEL TRACK from the ITEM field.
3. Select BOX from the MODE field.
4. Set the top left-hand corner of the box cursor on point A by operating the trackball.
5. Press the [ENT] key.
6. Set the top right-hand corner of the box cursor on point B by operating the trackball.
7. Press the [ENT] key.
8. Press the [ENT] key again.

Note that current track and replayed track cannot be deleted with the crosshair cursor - use the box cursor.

Deleting all track

To delete all track, do the following:

1. Press the [MENU] key.
2. Press the [7] key to select APPORTION/DELETE MEMORY.
3. Press the [2] key to select DELETE TRACK.

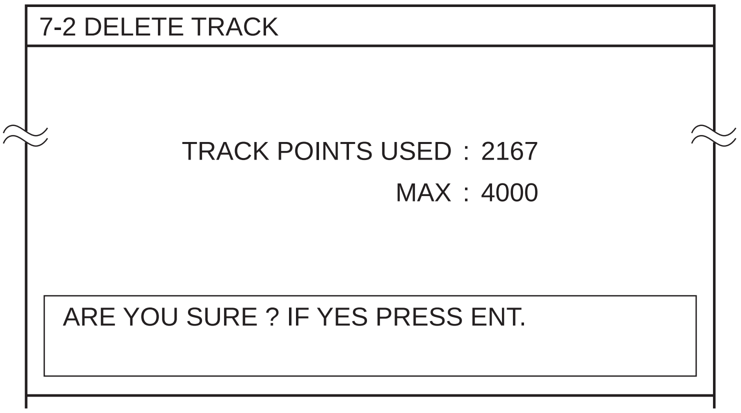


Figure 2-9 DELETE TRACK display

4. Press the [ENT] key.

2.5 Track Plotting Interval

The plot interval determines how the track will be reconstructed on the display and track storage time. The equipment has two plot intervals, plot interval 1 and plot interval 2, which you can set as desired. You can select which one to use by the [PLOT INTVL] key. This section shows you how to preset the plot intervals, on the INITIAL SETTINGS menu.

How the track is drawn

The “quality” of the track displayed largely depends on the plot interval setting, smoothing rate, etc. In drawing the track, first the ship’s position fed from the navigation receiver is stored into this unit’s memory at an interval of time or distance selected by the operator. This interval of time or distance is called the “Plot Interval” and it is selected considering the ship’s speed, the chart scale, etc. If a shorter interval is selected, a reconstructed course line is provided with better accuracy, but total storage time of the track is reduced.

Plot interval and track reconstruction

Obviously there is a trade off between smooth reconstruction of the track and plot storage time: The shorter the interval the smoother the reconstruction but storage time is reduced. Figure 2-10 compares plot interval and track reconstruction.

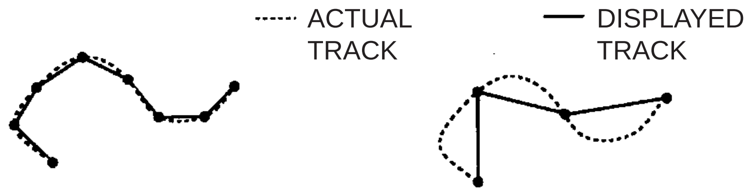


Figure 2-10 Plot interval and track reconstruction

Plot interval by time or distance

The plot interval can be selected by “Time” (00 sec. to 99.59 min.) or “Distance” (00 nm to 9.99 nm). If the plot interval is selected by distance, you will not use up memory points when the boat is anchored.

Setting plot interval 1 by time

The default plot method for plot interval 1 is time. To set plot interval 1 by time do the following:

1. Press the [MENU] key.
2. Press the [8] key to select INITIAL SETTINGS.
3. Select the PLOT INTERVAL 1 field.

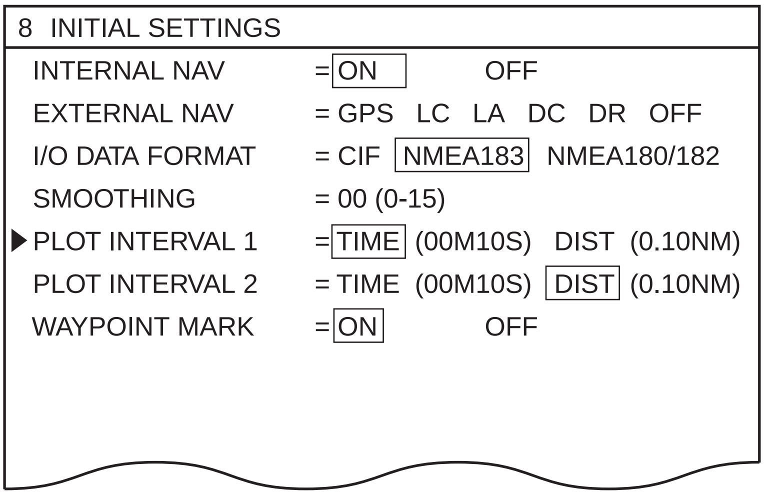


Figure 2-11 INITIAL SETTINGS menu

4. Enter a plot interval. To enter 30 seconds, for example, press [0], [0], [3] and [0].
5. Press the [ENT] key.

Setting plot interval 2 to “time”

The default plot method for PLOT INTERVAL 2 is distance. However, it may be set for time as follows:

1. Press the [MENU] key.
2. Press the [8] key to select INITIAL SETTINGS.
3. Select the PLOT INTERVAL 2 field.
4. Select TIME.
5. Enter a plot interval. To enter 15 minutes, for example, press [1], [5], [0], [0].
6. Press the [ENT] key.

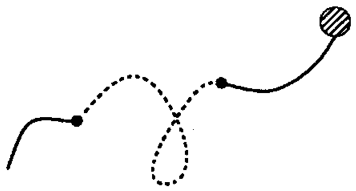
2.6 Customizing the Hold Function

The hold function stops recording the track to conserve track memory. You can customize this functions as below.

Turning off track display when track is not being recorded

When you stop recording the track in the default setting, the track is displayed but not recorded. If you do not want to show the portion of the track not recorded, you can turn it off as follows:

1. Press the [MENU] key.
2. Press the [8] key to select INITIAL SETTINGS.
3. Select OFF from the TRACK (HOLD PLOT) field.
4. Press the [ENT] key.



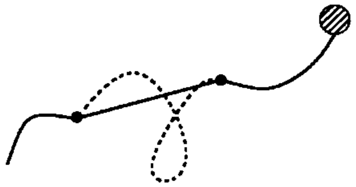
Line (hold plot) off

Figure 2-12 Appearance of track when track during hold is not displayed

Connecting track after restarting track recording

The default hold function does not connect where recording is stopped and restarted. If you want to connect those points do the following:

1. Press the [MENU] key.
2. Press the [8] key to select INITIAL SETTINGS.
3. Select ON from LINE (HOLD PLOT) field.
4. Press the [ENT] key.



Line (hold plot) on

Figure 2-13 Line connects track (not recorded) after recording is resumed

2.7 Customizing the PLOT INTVL Key

Each time you press the [PLOT INTVL] key, in the default setting, a plot interval is selected (plot interval 1 or plot interval 2) or recording of the track is turned off. If you do not need one of the plot intervals or you would like to reserve one of them for manual entry of plot interval, do the following:

Setup for manually entering plot interval

To enable manual entry of plot interval by the [PLOT INTVL] key;

1. Press the [MENU] key.
2. Press the [8] key to select INITIAL SETTINGS.
3. Select PLOT INTERVAL 1 or PLOT INTERVAL 2, whichever you want to use to manually enter plot interval.
4. Select TIME or DISTance.
5. Press the [CLR] key followed by the [ENT] key. Then, to manually enter plot interval, press the [PLOT INTVL] to select PLOT INTERVAL chosen in step 3, enter plot interval, then press the [ENT] key.

```
PLOT INTERVAL SETTING BY DISTANCE
  ▶ PLOT INTERVAL            =  – – MIN – – SEC
```

Figure 2-14 PLOT INTERVAL menu

Tuning off a plot interval

To turn off a plot interval;

1. Press the [MENU] key.
2. Press the [8] key to select INITIAL SETTINGS.
3. Select PLOT INTERVAL 1 or PLOT INTERVAL 2, whichever you want to turn off.

4. Select TIME or DISTance.
5. Press the [0] key four times followed by the [ENT] key. Then, when you press the [PLOT INTVL] the plot interval selected above is skipped.

3.1 Entering Marks

Marks can be electrically inscribed on the display to denote important locations. 4,000 marks may be entered, and you have the choice of mark shapes among circle, diamond, square, numeral (1-9), plus mark and minus mark.

When the mark memory becomes full no marks can be entered. In this case erase marks to enter new marks.

Entering marks with the cursor

1. With the trackball, place the cursor where you want to enter a mark.
2. Press mark key desired. To inscribe a plus mark, for example, press the [+] key.

Entering marks at own ship's position

1. Press the [CURSOR ON/OFF] key to turn off the cursor.
2. Press appropriate mark key (1-9).

Entering marks by manual input of latitude and longitude

Marks may be entered by manual input of latitude and longitude coordinates. This method is convenient for exact placement of marks.

1. Press the [WPT] key to display the REGISTER WAYPOINT menu.

```
REGISTER WAYPOINT
 ▶ MODE        = CURSOR  [L/L]  OS POS.   R/B   LIST
   WPT NO.     = – –
   LATITUDE    =   – – °  – – . – – –  N
   LONGITUDE   = – – – °  – – . – – –  E

   ENTER WAYPOINT NO., LATITUDE AND LONGITUDE.
   PRESS ENT TO REGISTER WAYPOINT.
        + : N, E, DISPLAY    – : S, W, NOT DISPLAY
```

Figure 3-1 REGISTER WAYPOINT menu

2. Select L/L from the MODE field.

3. Select the LATITUDE field. Enter latitude.
4. Select the LONGITUDE field. Enter longitude.
5. Press appropriate mark key (1-9).

3.2 Changing Current Mark Color

Mark color is available in the colors shown on keys 1-7. When a mark is entered it is inscribed in the color of the cursor mark in the data window at the top of the display. You can change mark color freely through the CHANGE MARK COLOR menu.

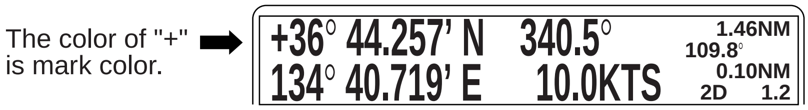


Figure 3-2 Location of mark color indication

1. Press the [MARK COLOR] key to show the CHANGE MARK COLOR menu.

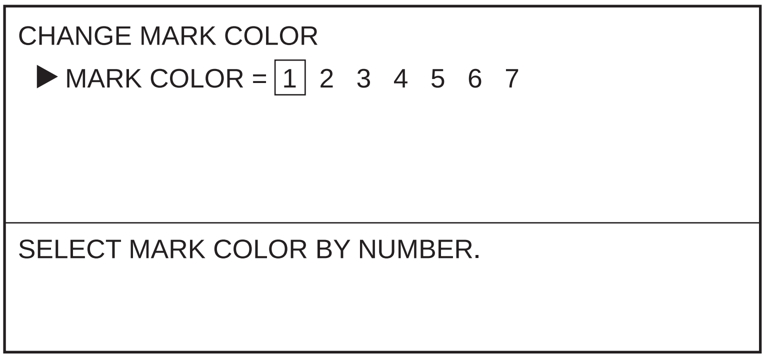


Figure 3-3 CHANGE MARK COLOR menu

2. Press appropriate numeric key among 1-7 to select color.
3. Press the [ENT] key.

3.3 Changing Shape, Color of Specific Marks

The color and shape of specific marks can be changed as follows:

1. Press [MENU], [9] and [1] to display the EDIT/TRACK MARK menu.

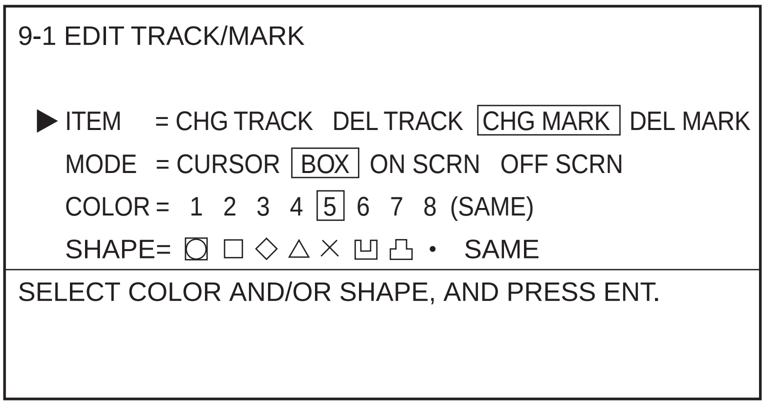


Figure 3-4 EDIT/TRACK MARK menu

2. Select CHG MARK from the ITEM field.
3. Select method of change from the MODE field:
   CURSOR: Select the marks to edit with the crosshair cursor.
   BOX: Circumscribe the marks to edit with the box cursor.
   ON SCRN: Edit all marks displayed on the screen.
   OFF SCRN: Edit marks stored in memory.
4. Select the COLOR field.
5. Select new mark color.
6. Select the TYPE field.
7. Select mark type desired.
8. For CURSOR or BOX, select start point.
9. Press the [ENT] key.
10. For CURSOR or BOX, select stop point.
11. Press the [ENT] key.
12. Press the [ENT] key again.

3.4 Deleting Marks

Deleting marks with the cursor

1. Operate the trackball to place the cursor on the mark you want to delete.
2. Press the [CLR] key.

If the mark cannot be erased, there may be several marks superimposed on one another. In this case, press the [CLR] key several times. Marks played back from a memory card cannot be deleted from screen.

Deleting specific marks

1. Press [MENU], [9] and [1] to display the EDIT/TRACK MARK menu.
2. Select DEL MARK from the ITEM field.
3. Select method of change from the MODE field:
   CURSOR: Select the marks to erase with the crosshair cursor.
   BOX: Circumscribe the marks to erase with the box cursor.
   ON SCRN: Erase all marks displayed on the screen.
   OFF SCRN: Erase marks stored in memory.
4. For CURSOR or BOX, select start point.
5. Press the [ENT] key.
6. For CURSOR or BOX, select stop point.
7. Press the [ENT] key.
8. Press the [ENT] key again.

Deleting all marks

1. Press [MENU], [7] and [3] to display the DELETE MARK screen.

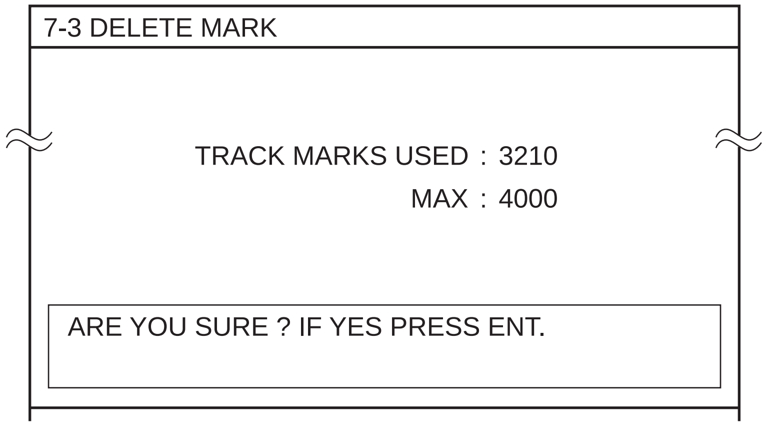


Figure 3-5 DELETE MARK screen

2. Press the [ENT] key.

3.5 External Event Mark

The external event mark shows your ship's position on the display at the exact moment the [EVENT] key is pressed on an external navigation device connected to the GD/GP-3300. It is marked on the screen with a red triangle.

Erasing an external event mark

Place the cursor on the mark and press the [CLR] key.

Turning on/off event mark display

You may turn the event mark on/off. Press [MENU] and [8], and then select ON or OFF from the EVENT MARK field as appropriate.

3.6 Target Mark

A target mark (⊗) shows a radar target's position. This mark is inscribed on the GD/GP-3300 when a certain key is pressed on the radar. The following are a few of the FURUNO radars which can output a target mark to the GD/GP-3300: FR-1500 MARK-2 series, FR-1505 MARK-3 series, FR-2805 series, FR-2100 series, FR-2105 series.

3.7 Lines

A line can be electrically marked on the display to depict a fishing limit line, coastline, small island, danger area, etc. A line is made up of a series of latitude and longitude points: starting, intermediate and end.

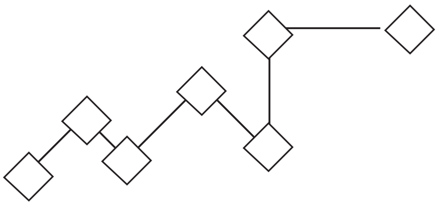


Figure 3-6 Sample line

Entering a line

1. Operate the trackball to place the cursor on position desired for starting point of line.
2. Press [◇]
3. Operate the trackball to place the cursor on the position desired for intermediate (or end) point.
4. Press [-◇]
5. To enter another point for the line, repeat steps 3 and 4.

Starting a new line

To add a point to the last-entered line, you simply designate the location with the cursor and then press [-◇]. To enter a new line, start at step 1 above.

Changing line color

Lines and marks share the same color. If you want to change line color, therefore, press the [MARK COLOR] key and then select color desired.

Deleting lines

Deleting individual points on a line

Operate the trackball to set cursor intersection on a triangle mark of the line you want to delete and then press the [CLR] key.

Deleting all lines

1. Press [MENU], [7] and [3] to display the DELETE MARK screen.

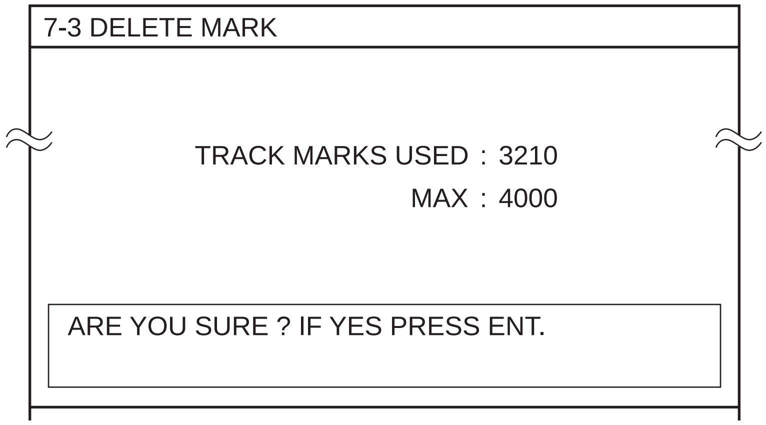


Figure 3-7 DELETE MARK menu

2. Press the [ENT] key.

In navigation terminology, a particular location is known as a "Waypoint," whether it be a starting point, a destination point or an intermediate point on a voyage.

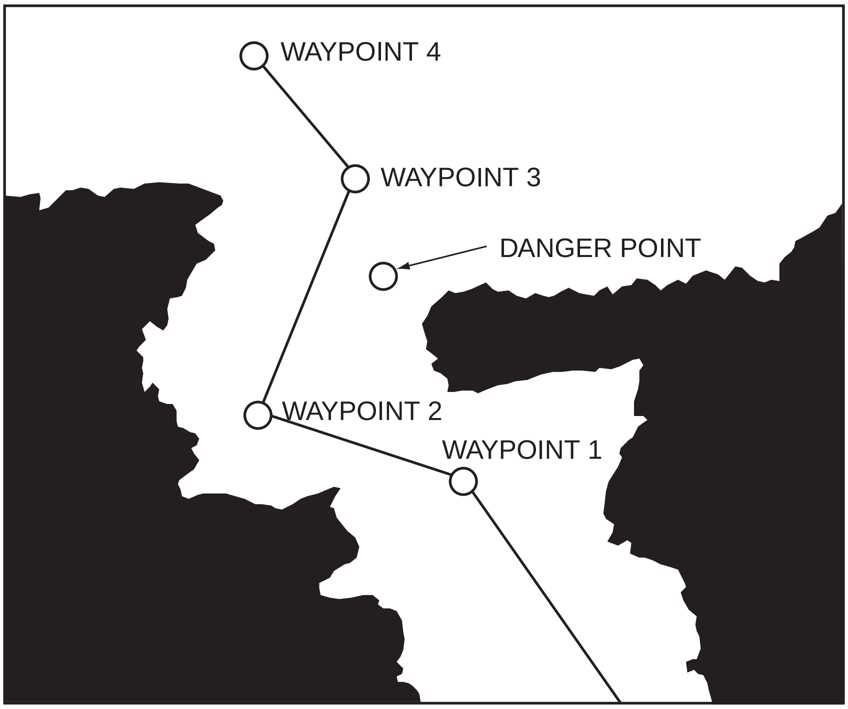


Figure 4-1 Waypoints

The GD/GP-3300 series has 98 waypoints into which you can enter position information. They are numbered from "zero-zero" (00) to ninety-nine (99) and colored yellow. (Waypoint color cannot be changed.) Waypoint "00" is reserved for use when your present position is used as a starting waypoint, to find range and bearing to a point. This will be explored in more detail later.

Waypoint "99" is an external waypoint where "To" waypoint selected on the connected navaid is automatically stored.

4.1 Entering Waypoints

A waypoint may be entered by latitude and longitude coordinates, by the cursor, at ship's position, by range and bearing, and with position from a navigator.

Waypoint entry by L/L coordinates

Let us assume for purposes of illustration that you wish to enter the position of San Francisco into waypoint 6. The coordinates are: 37 degrees, 40.000 minutes North Latitude, and 122 degrees, 24.000 minutes West Longitude. The keying sequence would be as follows:

1. Press the [MENU] key.
2. Press the [1] key to display the WAYPOINT list.

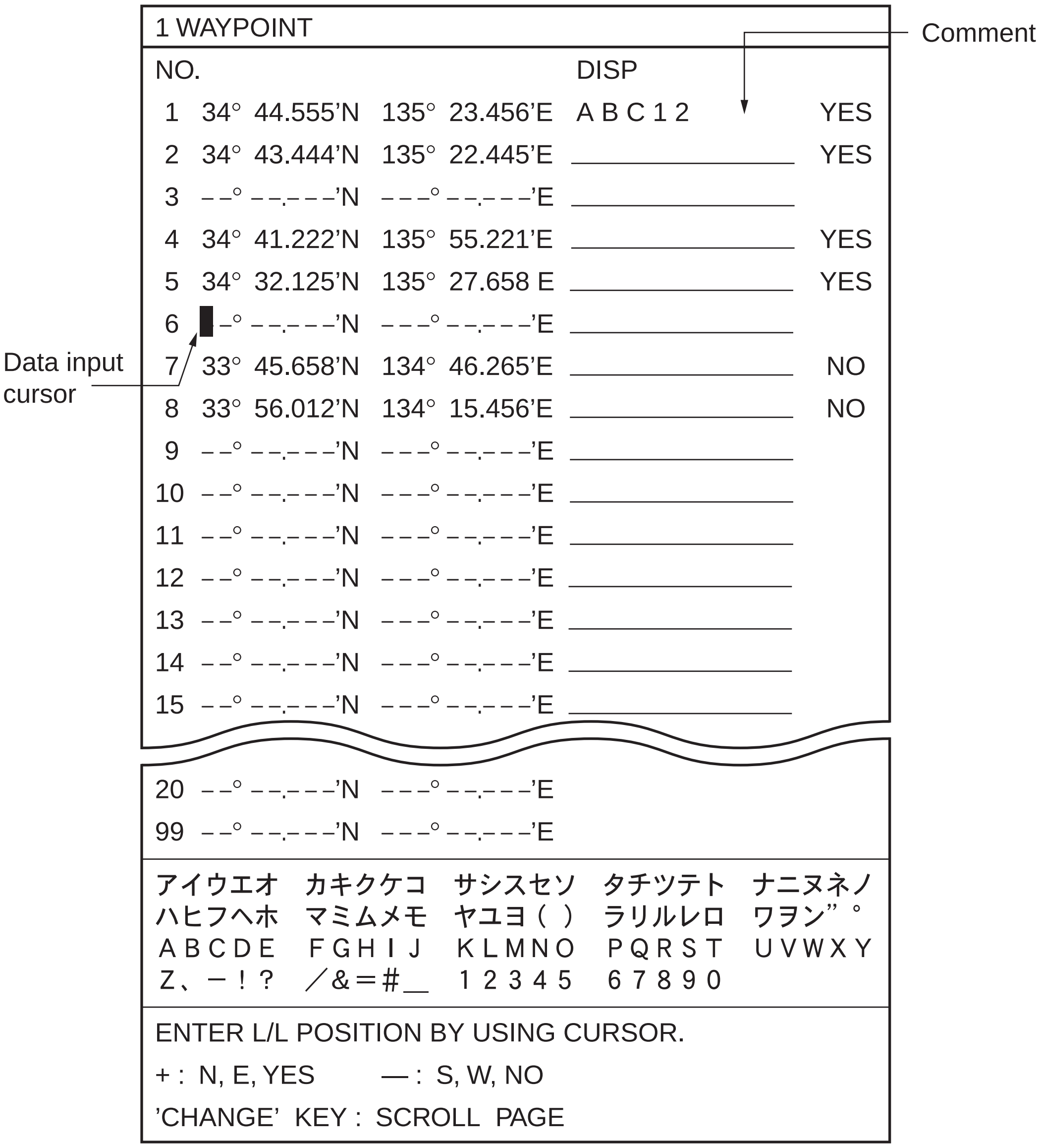


Figure 4-2 Waypoint list

3. Place the data input cursor on waypoint 6.

4. Enter latitude.

   Cancel entire line of data: Press the [CLR] key.

   Change data: Place data input cursor on wrong data, and then reenter data.

   Switch coordinates: [+] key, changes coordinate to North or East, [-] key, changes coordinate to South or West.

5. Place the data input cursor to the first digit of longitude and then enter longitude.

6. Enter comment, if desired.

   Note: Waypoint comment can be entered on the Waypoint List. See 4.2 Entering a Waypoint Comment.

7. Press the [ENT] key.

Waypoint entry by cursor

1. Press the [WPT] key to display the REGISTER WAYPOINT menu.

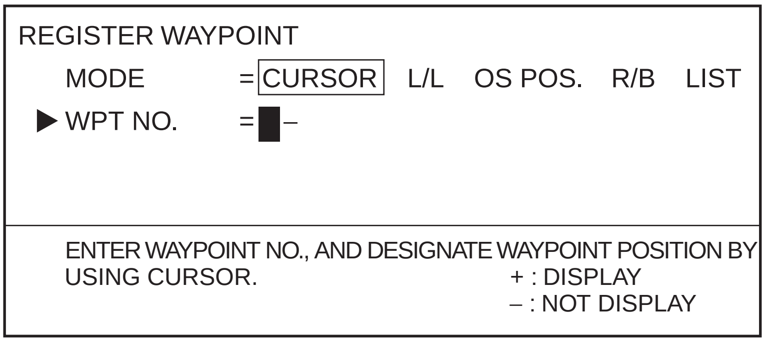


Figure 4-3 REGISTER WAYPOINT menu

2. Select CURSOR from the MODE field, if it is not already selected.

3. Select WPT NO.

4. Enter waypoint number in two digits. If the waypoint number is 07, for example, press [0] and [7].

   Note 1: If the waypoint number is already used, "(USED)" appears to alert you. You can enter a new number by pressing the [CLR] key, or overwrite the waypoint number by going to step 5.

   Note 2: You can register a waypoint without entering waypoint number, in which case the unit automatically registers the waypoint in the youngest, unused waypoint. For example, if waypoints 01, 02, 04 and 05 are used when you enter a waypoint without designating waypoint number, the unit will automatically register that waypoint as waypoint number 03.

5. Operate the trackball to place the cursor on position desired.
6. Press the [ENT] key.
7. Press the [WPT] key to finish.

Waypoint entry at own ship's position

1. Press the [WPT] key to display the REGISTER WAYPOINT menu.

```
REGISTER WAYPOINT
 ▶ MODE          = CURSOR   L/L  [OS POS.]  R/B   LIST
   WPT NO.       = – –

   ENTER WAYPOINT NO.
   PRESS ENT TO REGISTER WAYPOINT.   + : DISPLAY
                                     – : NOT DISPLAY
```

Figure 4-4 REGISTER WAYPOINT menu

2. Select OS POS from the MODE field.
3. Select WPT NO.
4. Enter waypoint number in two digits.
5. Press the [ENT] key.
6. Press the [WPT] key to finish.

Waypoint entry by range and bearing

This method is useful when you want to enter a waypoint using range and bearing to a target found on radar.

1. Press the [WPT] key to display the REGISTER WAYPOINT menu.
2. Select R/B from the MODE field.

```
REGISTER WAYPOINT
 ▶ MODE          = CURSOR   L/L   OS POS.  [R/B]   LIST
   WPT NO.       =   – –
   RANGE         = – – – . – – –   NM
   BEARING       = – – – . – °     MAG
   ENTER WAYPOINT NO., RANGE AND BEARING.
   PRESS ENT TO DISPLAY WPT L/L.
   PRESS ENT AGAIN TO REGISTER WAYPOINT.
        + : N, E, DISPLAY    – : S, W, NOT DISPLAY
```

Figure 4-5 REGISTER WAYPOINT menu

3. Select WPT NO.
4. Enter waypoint number in two digits.
5. Select the RANGE field.
6. Enter range.
7. Select the BEARING field.
8. Enter bearing.
9. Press the [ENT] key to calculate position. The latitude and longitude position of the range and bearing entered appears on the display.
10. Press the [ENT] key again to register the waypoint.

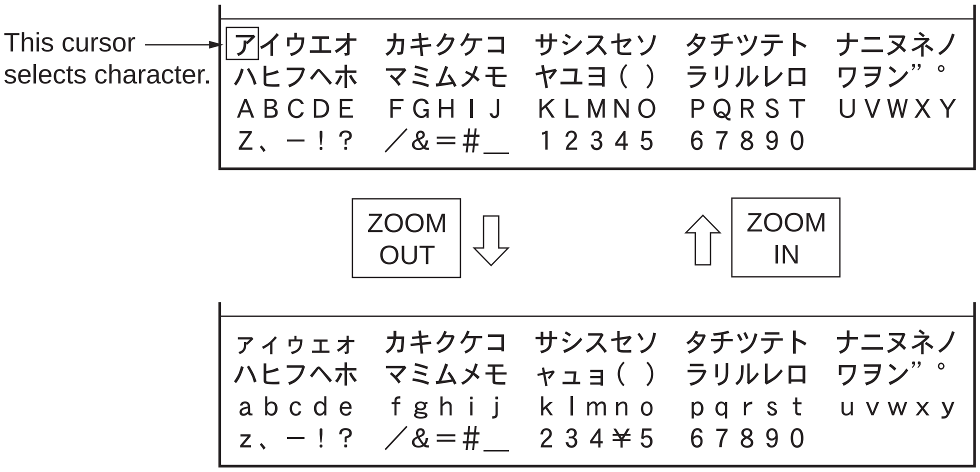
Waypoint entry by navigation aid

The “TO” waypoint selected on the navigation aid connected is automatically sent to the GD/GP-3300 as an external waypoint.

4.2 Entering a Comment for a Waypoint

You can enter a comment for a waypoint in the WAYPOINT list. The comment can consist of 10 alphanumeric characters.

1. Press the [MENU] key followed by the [1] key to display the WAYPOINT LIST.
2. Press arrow keys to set data input cursor on the line desired in the comments column.
3. Operate the trackball to circumscribe the first character for your comment. You can switch between upper and lower case characters with the [ZOOM IN], [ZOOM OUT] keys. See Figure 4-6.



(These are lower case characters.)

Figure 4-6 Characters available for use as a waypoint comment

4. Press the [ENT] key. (If you enter a wrong character, set the data input cursor on wrong character and then enter correct character.)

5. Repeat steps 2 and 3 to complete comment.

6. Press [→] to set the cursor out of the comments column and then press the [ENT] key.

4.3 Turning Specific Waypoint Displays On/Off

Turning on/off specific waypoints displays through the REGISTER WAYPOINT menu

1. Press the [WPT] key to display the REGISTER WAYPOINT menu.

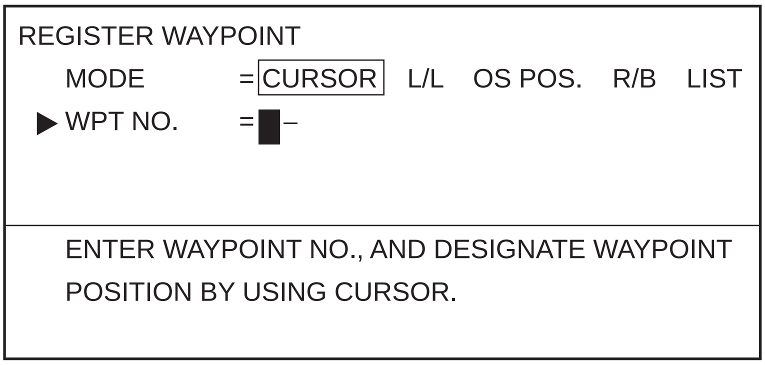


Figure 4-7 REGISTER WAYPOINT menu

2. Select L/L from the MODE field.

3. Select WPT NO.

4. Press [-] (turn off) or [+] (turn on), enter waypoint number to turn on/off.

5. Press the [ENT] key.

Turning on/off specific waypoints displays through the waypoint list

1. Press the [MENU] key to display the menu.
2. Press the [1] key to display the WAYPOINT list.

1 WAYPOINT

NO.				DISP
1	34° 44.555 N	135° 23.456 E	A B C 1 2	YES
2	34° 43.444 N	135° 22.445 E	________	YES
3	––° ––.–––'N	–––° ––.–––'E	________	
4	34° 41.222 N	135° 55.221 E	________	YES
5	34° 32.125 N	135° 27.658 E	________	YES
6	––° ––.–––'N	–––° ––.–––'E	________	
7	––° ––.–––'N	–––° ––.–––'E	________	YES
8	––° ––.–––'N	–––° ––.–––'E	________	YES
9	––° ––.–––'N	–––° ––.–––'E	________	
10	█–° ––.–––'N	–––° ––.–––'E	________	
11	––° ––.–––'N	–––° ––.–––'E	________	
12	––° ––.–––'N	–––° ––.–––'E	________	
13	––° ––.–––'N	–––° ––.–––'E	_____	

← DISP

Figure 4-8 Sample waypoint list

3. Place the cursor on the waypoint (number) you want to turn on/off.
4. Set the cursor in the DISP column.
5. Press [-] to display NO, or [-] to display YES.
6. Press the [ENT] key.

4.4 Deleting Waypoints

You can delete unnecessary waypoints by the cursor or through the waypoint list.

Deleting waypoints by cursor

1. Place the cursor on the waypoint you want to delete.
2. Press the [CLR] key.

Deleting waypoints through waypoint list

1. Press the [MENU] key followed by the [1] key to display the WAYPOINT list.
2. Select the waypoint you want to delete.
3. Press the [CLR] key.
4. To delete another waypoint, repeat steps 2 and 3.
5. Press the [ENT] key.

Deleting external waypoint (99)

1. Cancel destination waypoint on connected navigation aid.
2. Display the cursor and operate the trackball to place the cursor on waypoint 99.
3. Press the [CLR] key.

4.5 Destination Waypoint

By setting a destination waypoint, you can find the range and bearing from your vessel to a latitude and longitude position. You can set a destination waypoint by cursor, waypoint number, range and bearing, and route number. (Route number is a special method so it is dealt with in a later section.)

Setting destination waypoint by cursor

1. Press the [FR/TO] key to display the DESTINATION SETTING menu.

```
DESTINATION SETTING
 ▶ DEST        = [SET]   CANCEL
   MODE        = [CURSOR]   WAYPOINT   ROUTE R/B

   SELECT DESTINATION BY USING CURSOR AND PRESS ENT.
   INTERMEDIATE POINTS CAN BE SET BY USING + KEY.
```

Figure 4-9 DESTINATION SETTING menu

2. Select CURSOR from the MODE field.

3. Place the cursor on latitude and longitude position desired for destination waypoint. Note that if you place cursor near a mark or a waypoint displayed, cursor position (destination waypoint) is pulled into the mark displayed.

4. Press the [ENT] key

Setting destination waypoint by waypoint number

1. Press the [FR/TO] key to display the DESTINATION SETTING menu.

```
DESTINATION SETTING
 ▶DEST    = [SET]          CANCEL
  MODE    =  CURSOR      [WAYPOINT]    ROUTE R/B
  WPT NO. =  0 0 + – – + – – + – – + – – + – – + – – + – – +
             + – – + – – + – – + – – + – – + – – + – – + –
-------------------------------------------------------------
  ENTER WAYPOINT NO.
```

Figure 4-10 DESTINATION SETTING menu

2. Select WAYPOINT from the MODE field.

3. Select WPT NO.

4. Enter waypoint number(s) in two digits. If the waypoint number is 07, for example, press [0] and [7].

5. Press the [ENT] key.

Note: The message “DATA ERROR” appears on the display when the waypoint number entered is not registered.

Setting destination waypoint by range and bearing

1. Press the [ENT] key to display the DESTINATION SETTING menu.

2. Select R/B from the MODE field.

3. Select RANGE.

4. Enter range.

5. Select BEARING.

6. Enter bearing.

7. Press the [ENT] key twice.

When you set a destination waypoint...

- The DESTINATION SETTING menu disappears.
- Destination waypoint is marked with a yellow flag (except destination set by registered waypoints).
- Your ship’s position is shown as waypoint 00.
- A light-blue dashed line connects your ship’s position with destination waypoint. This line shows the ideal course.

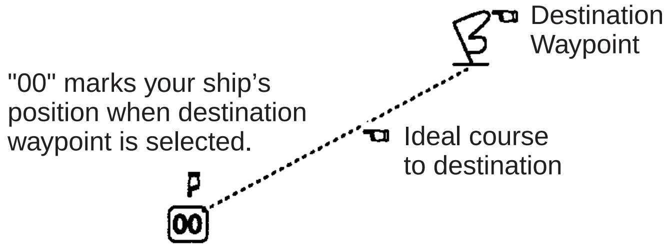


Figure 4-11 How a destination waypoint is shown on the display

Displaying range and bearing to destination waypoint

Press the [PLOT] key to display the DATA DISPLAY (2).

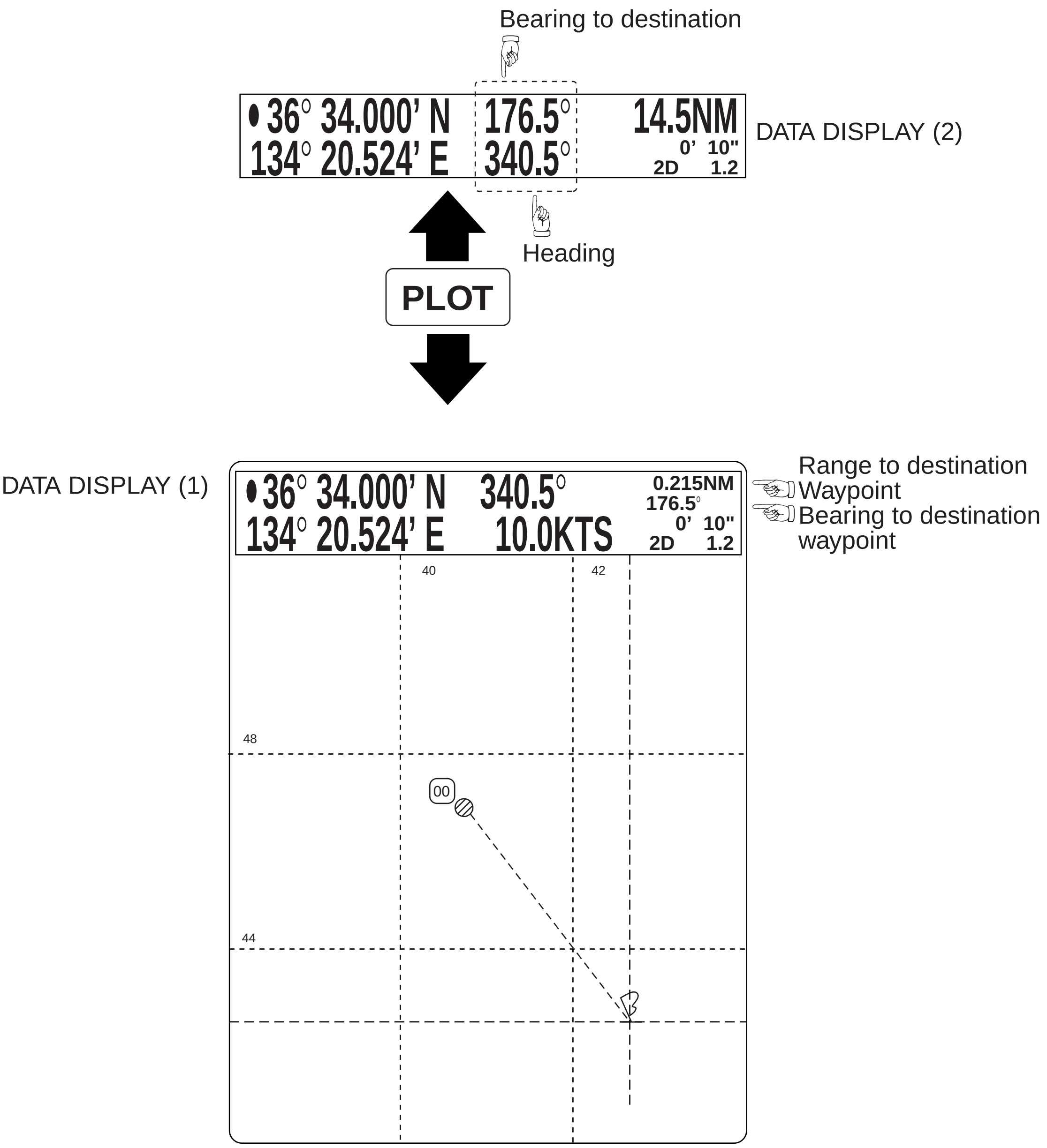


Figure 4-12 Location of destination waypoint information

4.6 Cancelling Destination Waypoint

Once you arrive at your destination you probably won't need the destination waypoint. You can cancel it, three ways.

Cancelling destination waypoint through the menu

1. Press the [FR/TO] key to display the DESTINATION SETTING menu. The first line shows the latitude and longitude of the destination waypoint for your confirmation.

```
DESTINATION SETTING
 ▶ DEST     = [SET]          CANCEL
   MODE     =  CURSOR       [WAYPOINT]    ROUTE R/B
   WPT NO. =  0 0 + – – + – – + – – + – – + – – + – – + – – +
              + – – + – – + – – + – – + – – + – – + – – + –
-------------------------------------------------------------
   ENTER WAYPOINT NO.
```

Figure 4-13 DESTINATION SETTING menu

2. Select CANCEL from the DEST field.
3. Press the [ENT] key.

Cancelling destination waypoint by key input

Method 1: Press [FR/TO], [CLR], [ENT].

Method 2: Press [FR/TO], [0], [ENT].

ROUTE NAVIGATION

In many cases a trip from one place to another involves several course changes, requiring a series of route points (waypoints) which you navigate to, one after another. The sequence of waypoints leading to the ultimate destination is called a route. This unit can automatically advance to the next waypoint on a route, so you do not have to change the destination waypoint repeatedly. The figure below shows an example of a route between two points, involving six waypoints.

ROUTE: 01 (□□PORT/ △△PORT)

Transit Order	Waypoint
1	WPT 06
2	WPT 05
3	WPT 04
4	WPT 03
5	WPT 02
6	WPT 01

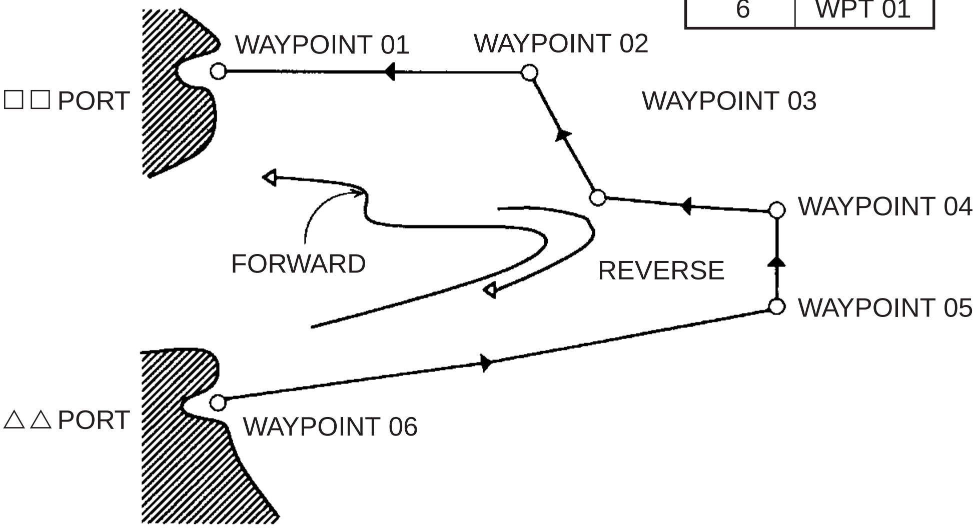


Figure 5-1 Sample route

You can store 10 routes and a route may contain up to 15 waypoints. The 3300 automatically assigns a route number from 0-9. Be sure to record all important routes in a separate log and save them to a memory card. This unit is not a fail-safe record keeping device.

5.1 Creating Routes

You can create a route three ways: through the route list (by latitude and longitude coordinates), by previously registered waypoints, by cursor.

Creating routes through the route list

1. Press the [MENU] key.
2. Press the [2] key to display the ROUTE list.

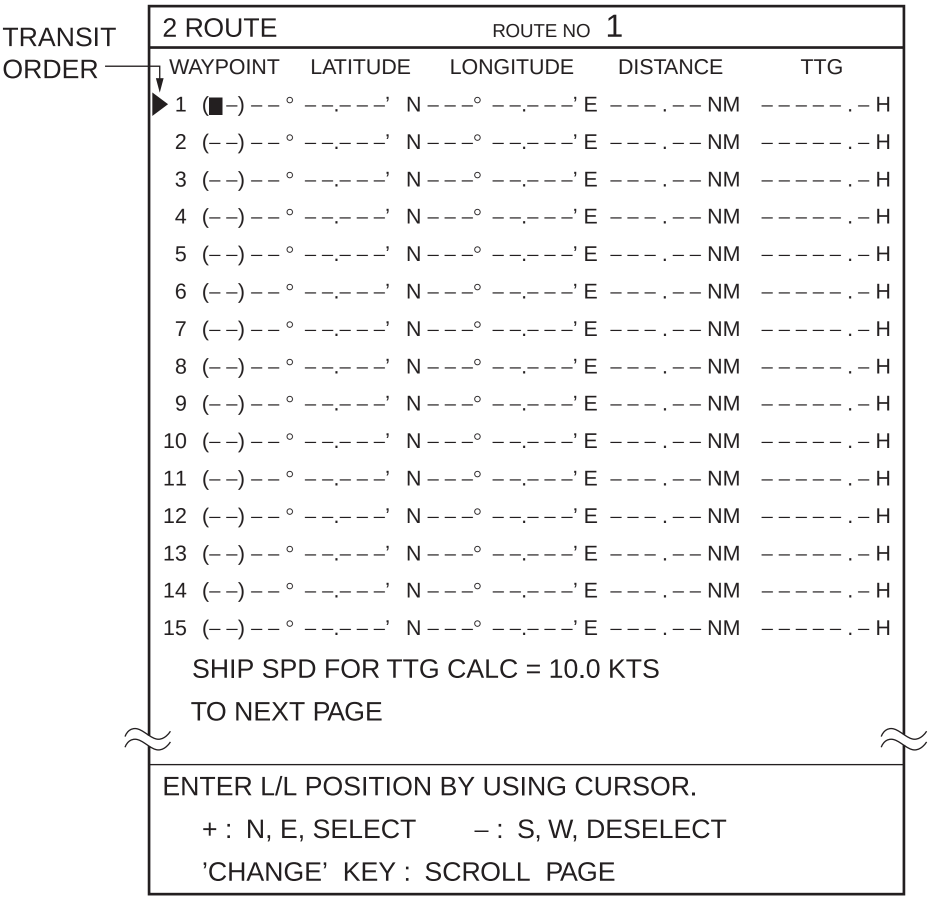


Figure 5-2 ROUTE list

3. Enter latitude and longitude of each route waypoint.
4. Press the [ENT] key.

Creating routes with waypoint numbers: MENU key

1. Press the [MENU] key.

2. Press the [2] key to display the ROUTE list.

2 ROUTE		ROUTE NO 1		
WAYPOINT	LATITUDE	LONGITUDE	DISTANCE	TTG
1 (2 8)	3 4 ° 4 5.1 4 6' N	1 3 5° 2 1.2 1 7 E	– – – . – – NM	– – – – – . – H
▶ 2 (■–)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
3 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H

Figure 5-3 ROUTE list

3. Press [←] twice.

4. Enter first waypoint number of route in two digits. If it is 08, for example, press [0] and [8]. The L/L position of the waypoint appears.

5. Press [↓] followed by [←] twice to send the data input cursor to the next line. Enter waypoint number. Its L/L position appears.

6. Repeat step 6 to enter another waypoint.

7. To enter another route, press the [ ] key to scroll page.

8. After entering all information, press the [ENT] key.

Creating routes with waypoint numbers: ROUTE key

1. Press the [ROUTE] key to display the ROUTE NO. menu.

ROUTE NO.
▶ MODE = CURSOR [WAYPOINT] ??? LIST
ROUTE NO. = – –
WPT NO. = 0 0 + – – + – – + – – + – – + – – + – – + –
\+ – – + – – + – – + – – + – – + – – + – – + – –

ENTER ROUTE NO., AND WAYPOINT NO.
PRESS ENT TO REGISTER.

Figure 5-4 ROUTE NO. menu

2. Select WAYPOINT from the MODE field.

3. Select ROUTE NO.

4. Enter route number in two digits. If the route number is 01, for example, press [0] and [1].

5. Select WPT NO.

6. Enter waypoint numbers.

7. Press the [ENT] key.

Creating routes with the cursor

1. Press the [ROUTE] to display the ROUTE NO. menu.

```
ROUTE NO.
 ▶MODE       = [CURSOR]  WAYPOINT   ???   LIST
  ROUTE NO. = █–

  ENTER ROUTE NO., AND SELECT WAYPOINTS,
  PRESSING + KEY AFTER SELECTIONS.
  PRESS ENT TO REGISTER.
```

Figure 5-5 ROUTE NO. menu

2. Enter route number in two digits. (Don't press the [ENT] key yet.)

3. Operate the trackball to place the cursor on L/L position desired for first route waypoint.

4. Press [+]. If you want to cancel a point, press [-].

5. Repeat steps 3 and 4 to enter other points.

6. Press the [ENT] key. Route waypoints entered by the cursor are marked with a yellow flag and connected with a green dashed line.

5.2 Following a Route

Following a route is the process by which you use a stored route for navigation. This unit displays navigation information to guide you from one waypoint to the next, as it automatically switches from waypoint to waypoint in sequence.

1. Press the [FR/TO] key to display the DESTINATION SETTING menu.

```
ROUTE NO.
   DEST        = [SET]  CANCEL
 ▶ MODE        = CURSOR  WAYPOINT  [ROUTE]  R/B
   ROUTE NO.   = – –
   FWD/REV     = [FORWARD]  REVERSE
-----------------------------------------------
   ENTER ROUTE NO., AND SELECT FORWARD OR
   REVERSE.
```

Figure 5-6 DESTINATION SETTING menu

2. Select ROUTE from the MODE field.
3. Select the ROUTE NO. field.
4. Enter route number by two digits.
5. Select the FWD/REV field.
6. Select route transit direction; forward or reverse.
7. Press the [ENT] key.

About route navigation

When a route is selected for navigation its waypoints are marked by yellow flags (except waypoint-created routes) and connected with a light-blue dashed line.

The unit will automatically select the first waypoint in the route plan for you go to towards from your present position. Once you arrive within the radius of the arrival alarm, the unit will automatically switch to the next waypoint in sequence.

You might also try another way to “arrive” at your destination waypoint. This involves changing the arrival alarm range to a larger number. This way too is fraught with danger, for if you specify the alarm range too loosely, let’s say 0.5 nautical miles, you will need to allow the automatic switching to the next destination waypoint to occur, but you may then define a new course to the next waypoint

that takes you through a seawall or over land! It is far better to leave a reasonable arrival alarm range of say 0.1 nautical miles, and when you get as close as safely possible to the desired waypoint which is now blocked then manually override the route planning mode and go to manual waypoint sequencing.

Note: In some instances waypoints on a route may not be connected. If this is the case;
1) Check setting of ROUTE LINE on menu 96.
2) Try reformatting the display.
3) An intermediate waypoint may be selected by the arrival alarm range. If this is the case, make the alarm range smaller. Note that the arrival alarm range remains in effect in route navigation even when the arrival alarm itself is turned off.

5.3 Temporarily Deselecting a Route Waypoint

A route waypoint may be deselected temporarily by entering a “-” (minus) to the left of the route waypoint on the ROUTE list. Using Figure 5-7 as an example, you would want to temporarily deselect route waypoints 04, 05 and 06, since your ship is to traverse the route in the order of route waypoints 03, 02 and 01.

The temporarily deselected route waypoint may be restored at any time by entering a plus sign next to the deselected route waypoint number.

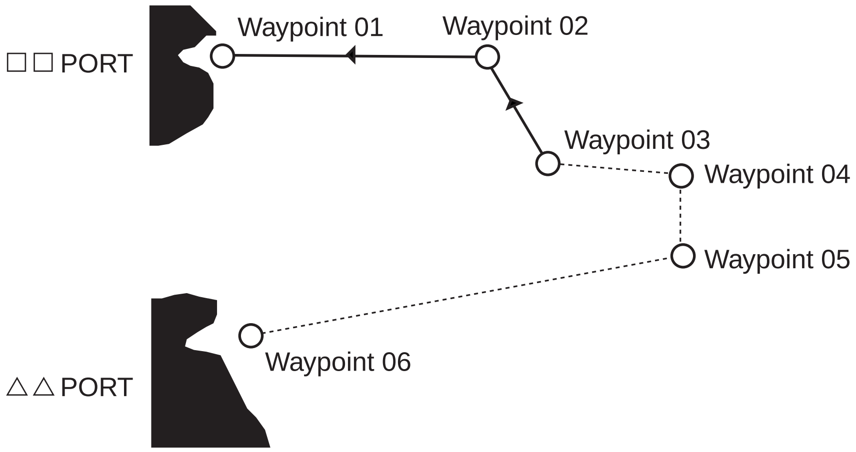


Figure 5-7 Example of when to deselect waypoints

1. Press the [MENU] key.
2. Press the [2] key to display the ROUTE list.
3. Press the [⌒] key to select route.
4. Place the cursor on the waypoint you want to deselect.
5. Press [←] to place the cursor on a digit in the WAYPOINT column.

Cursor →

Minus sign (waypoint deselected) →

2 ROUTE			ROUTE NO 1			
WAYPOINT		LATITUDE		LONGITUDE	DISTANCE	TTG
▶ 1 – (06) 34°		21.185’	N134°	08.122’E	– – – . – – NM	– – – – – . – H
2 – (05) 34°		24.068’	N135°	45.012’E	– – – . – – NM	– – – – – . – H
3 – (04) 35°		31.254’	N135°	20.314’E	– – – . – – NM	– – – – – . – H
4 – (03) 36°		18.314’	N134°	31.234’E	– – – . – – NM	– – – – – . – H
5 (02) 37°		33.568’	N134°	20.128’E	– – – . – – NM	– – – – – . – H
6 (01) 38°		01.438’	N133°	18.258’E	– – – . – – NM	– – – – – . – H

Figure 5-8 ROUTE list

6. Press [-]. In the figure above waypoints 1, 2, 3 and 4 are deselected.

5.4 Deleting Route Waypoints

Deleting specific route waypoints

1. Press the [MENU] key to display the menu.
2. Press the [2] key to select ROUTE.
3. Select route number by pressing the [◌] key.
4. Place the cursor on route waypoint you want to delete.
5. Press the [CLR]. In Figure 5-9, for example, position data for waypoint no. 2 is deleted. The next time you select the route, all route waypoints are automatically renumbered.

2 ROUTE			ROUTE NO 1		
WAYPOINT	LATITUDE		LONGITUDE	DISTANCE	TTG
1 (– –) 34°	45.146’	N 135°	21.217’ E	– – – . – – NM	– – – – – . – H
2 (– –) – – °	– –.– – –’	N – – –°	– –.– – –’ E	– – – . – – NM	– – – – – . – H
3 (– –) 33°	11.234’	N 128°	32.108’ E	– – – . – – NM	– – – – – . – H
4 (– –) 28°	34.564’	N 130°	41.416’ E	– – – . – – NM	– – – – – . – H

Figure 5-9 ROUTE list, showing deleted waypoint

6. Press the [ENT] key.

Deleting all route waypoints

1. Press the [ROUTE] key.
2. Select WAYPOINT.
3. Select ROUTE NO.
4. Enter route number.
5. Select WPT NO.
6. Press the [CLR] key followed by the [ENT] key.

5.5 Cancelling Route Navigation

You can cancel route navigation as follows:

1. Press the [FR/TO] key to display the DESTINATION SETTING menu.
2. Select CANCEL.
3. Press the [ENT] key. The color of the line connecting route waypoints changes from light-blue to green to indicate that route navigation has been cancelled.

5.6 Route Calculation

The route calculation function provides distance and time-to-go calculations between each route waypoint.

1. Press the [MENU] key.
2. Press the [2] key to select ROUTE.

2 ROUTE ROUTE NO 1

WAYPOINT	LATITUDE	LONGITUDE	DISTANCE	TTG
▶ 1 (– –)	■ – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
2 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
3 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
4 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
5 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
6 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
7 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
8 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
9 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
10 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
11 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
12 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
13 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
14 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H
15 (– –)	– – ° – –.– – –' N	– – –° – –.– – –' E	– – – . – – NM	– – – – – . – H

SHIP SPD FOR TTG CALC = 10.0 KTS

TO NEXT PAGE

ENTER L/L POSITION BY USING CURSOR.

+ : N, E, SELECT — : S, W, DESELECT

'CHANGE' KEY : SCROLL PAGE

Figure 5-10 ROUTE list

3. Press the [↓] key to select unused route.
4. Enter route waypoints.
5. Select SHIP SPD FOR TTG CALC.
6. Enter ship's speed desired for the calculation. If ship's speed is 15 knots, for example, press [1], [5] and [0].
7. Press [↑].

ALARMS

There are six conditions that can trigger audible and visual alarms in this unit: Arrival alarm, Anchor Watch alarm, Cross-track Error (XTE) alarm, Border alarm, and Ship's Speed alarm (two types).

Up to three alarms can be actuated. When an alarm setting is breached, the audible alarm sounds and the alarm icon appears at the bottom right-hand corner of the display.

Note: The alarms are useful for alerting you to possibly dangerous situations. However, the captain is always responsible for the safe operation of his ship. FURUNO Electric Company will assume no responsibility for any damages associated with the use of the alarms.

6.1 Arrival Alarm, Anchor Watch Alarm

Arrival alarm

The arrival alarm warns you your ship is approaching a destination waypoint. The area that defines an arrival zone is that of a circle which you approach from outside the circle. The alarm will be released if your ship enters into the circle.

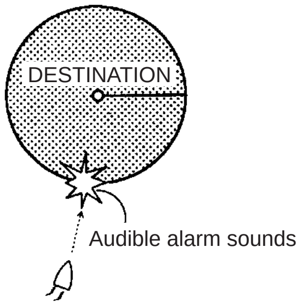


Figure 6-1 How the arrival alarm works

To set an arrival alarm limit of 0.05 nautical miles for waypoint 07 (destination waypoint), for example, you would do the following:

1. Press the [ALARM] key to display the ALARM menu.

ALARM	
▶ARR/ANCHOR	= ARR ANCHOR OFF
ALARM RANGE	= 0.500NM
XTE/BORDER	= XTE BORDER OFF
ALARM RANGE	= 0.250NM
SPEED	= IN OUT OFF
UPPER LIMIT	= 15.0KTS
LOWER LIMIT	= 11.0KTS

Figure 6-2 ALARM menu

2. Place the cursor on the ARR/ANCHOR field.
3. Select ARRival.
4. Press [↓] to select ALARM RANGE.
5. Enter alarm range. To enter 0.05 nautical miles, for example, press [0], [0], [5] and [0].
6. Press the [ENT] key.

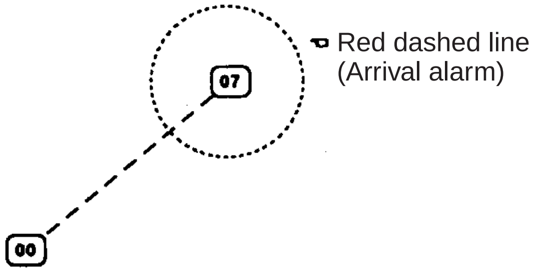


Figure 6-3 Alarm range of arrival alarm

Anchor watch alarm

The anchor watch alarm sounds to warn you that your ship is moving when it should be at rest.

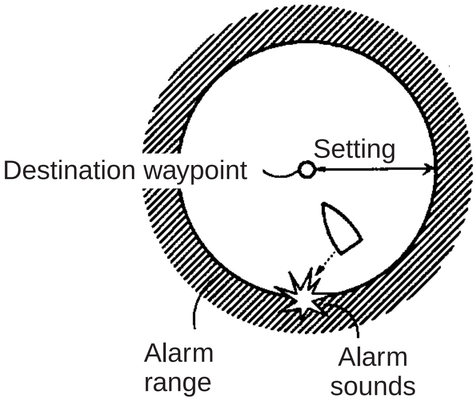


Figure 6-4 How the anchor watch alarm works

1. Press the [ALARM] key to display the ALARM menu.
2. Select ANCHOR from the ARR/ANCHOR field.
3. Press [↓] to select ALARM RANGE.
4. Enter alarm range. To enter 0.2 nautical miles, for example, press [0], [2], [0] and [0].
5. Press the [ENT] key.

6.2 XTE Alarm, Border Alarm

XTE alarm

The XTE (cross-track error) alarm alerts you when your ship strays from its intended course. You may preset the alarm limit from 0.01 nautical miles to a maximum lane width of 99.99 nautical miles. The alarm will be released when your ship goes out of the lane limits.

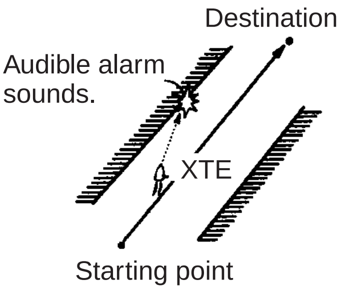


Figure 6-5 How the XTE alarm works

1. Press the [ALARM] key to display the ALARM menu.
2. Select XTE from the XTE/BORDER field.
3. Press [↓] to select ALARM RANGE.
4. Enter alarm range. To enter 0.02 nautical miles, for example, press [0], [2], [0] and [0].
5. Press the [ENT] key.

Border alarm

The border alarm defines an area, consisting of two waypoints, which you do not want to cross. The alarm will sound when your ship crosses the area defined by the two waypoints.

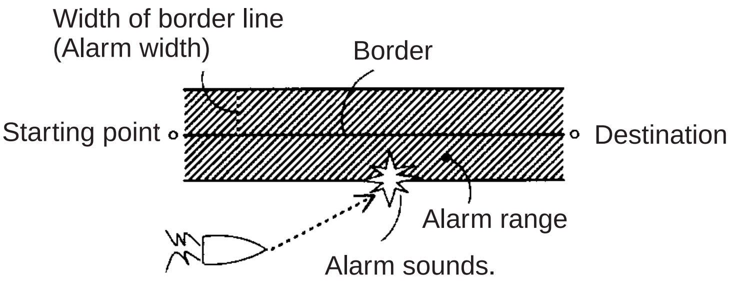


Figure 6-6 How the border alarm works

If you want to set a border alarm between waypoints 77 and 78 (must be preregistered) with an alarm range of 0.3 nautical miles, do the following:

1. Press the [FR/TO] key to display the DESTINATION SETTING menu.
2. Select WPT NO.

```
  MODE      = CURSOR     WAYPOINT    ROUTE
▶ WPT NO. = 0 0 + 0 –  0 –
            + – – + – – + – –
```

Figure 6-7 DESTINATION SETTING menu, lower half

3. Press [←] twice.

```
▶ WPT NO. = 0 0 + – – + – –
             + – – + – – + – –
```

Figure 6-8 DESTINATION SETTING menu

4. Enter waypoints 77 and 78 and press the [ENT] key.
5. Press the [ALARM] key to display the alarm menu.
6. Select BORDER from the XTE/BORDER field.
7. Press [↓] to select ALARM RANGE.
8. Enter alarm range. If the alarm range is 0.3 nautical miles for example, press [0], [3], [0] and [0].
9. Press the [ENT] key.

6.3 Ship's Speed Alarm

The ship's speed alarm sounds when your ship's speed is within or out of the alarm range (depending on which alarm is active) set.

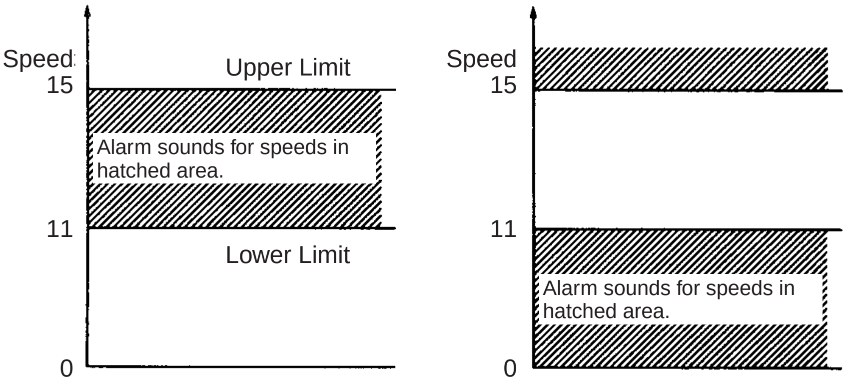


Figure 6-9 How the ship's speed alarm works

1. Press the [ALARM] key to display the ALARM menu.
2. Select SPEED.
3. Select IN or OUT.
4. Select UPPER LIMIT.
5. Enter desired upper limit.
6. Select LOWER LIMIT.
7. Enter desired lower limit.
8. Press the [ENT] key.

6.4 When the Alarm Buzzer Sounds...

Silencing the alarm buzzer

When an alarm setting is exceeded, the alarm buzzer sounds and the speaker icon appears at the bottom right-hand corner of the display. You can silence the buzzer by pressing the [CLR] key. The speaker icon remains on the display until the cause of the alarm is removed or the alarm itself is turned off.

What alarm is sounding?

When more than one alarm is active and the alarm sounds, you can see which alarm is sounding by pressing the [ALARM] key.

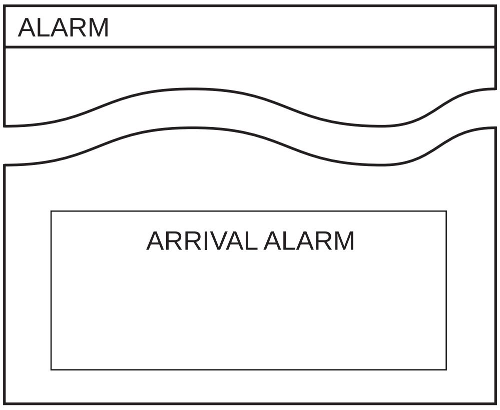


Figure 6-10 ALARM menu, showing location of alarm indication

VIDEO PILOT DISPLAY, NAVIGATION DATA DISPLAY

7.1 Video Pilot Display

Features

The video pilot display shows navigation information about your destination, using a course-up presentation. To display the video pilot display, press the [VIDEO PILOT] key. Figure 7-1 shows a typical video pilot display.

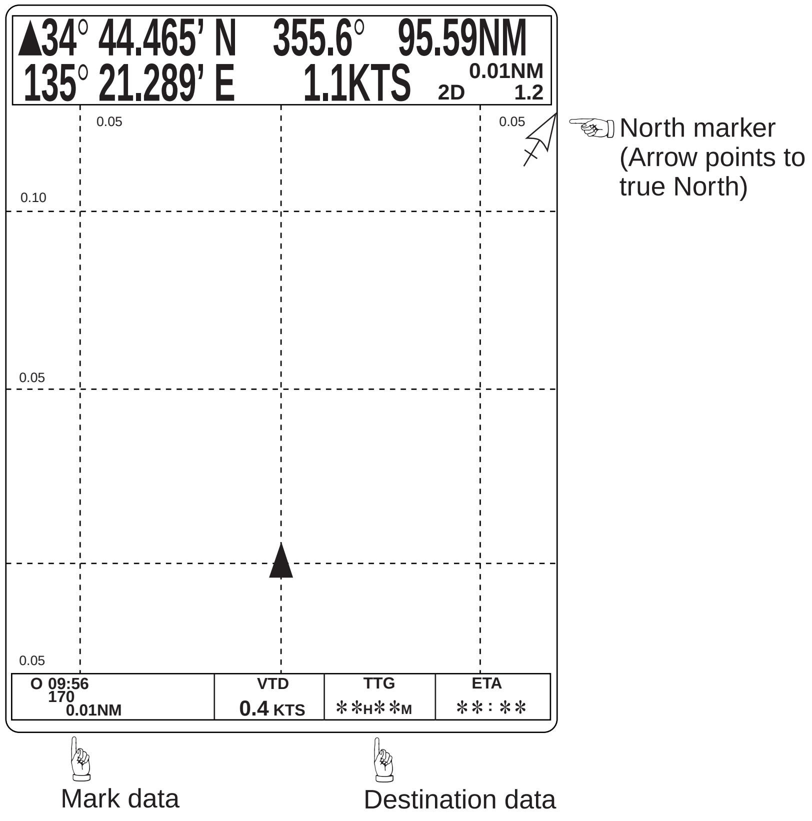


Figure 7-1 Sample video pilot display

Table 7-1 compares the features of the video pilot and plot displays.

Table 7-1 Comparison of video pilot and plot displays

Item	Plot Display	Video Pilot Display
Display Mode	North-up	Course-up
Own Ship Mark	Round	Triangle (depicts ship's bow)
Grid	L/L	Range
North Mark	None	Yes
Destination Data	None	VTD, ETA and TTG
Mark Data	None	Time entered and range and bearing data for last two marks

Destination data

Velocity-To-Destination (VTD)

Velocity to destination is the amount of speed in the direction of the desired destination.

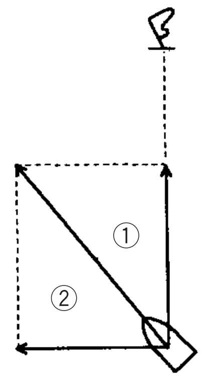


Figure 7-2 Velocity-to-destination

Time-To-Go (TTG)

Time-to-go is the amount of time in hours and/or minutes to arrive at your destination, using present course and speed. If there is no calculation, asterisks are shown.

Estimated Time of Arrival (ETA)

Estimated time of arrival is the time you will arrive at your destination, using present course and speed.

Mark data

The time entered and range and bearing of the last two entered marks are shown. This information remains on the video pilot display (even if those marks are deleted) until new marks are entered. You can turn off the mark data window by pressing [MENU], [9], [6], setting EVENT MARK WINDOW to OFF and pressing the [ENT] key.

Comparison of plot and video pilot displays

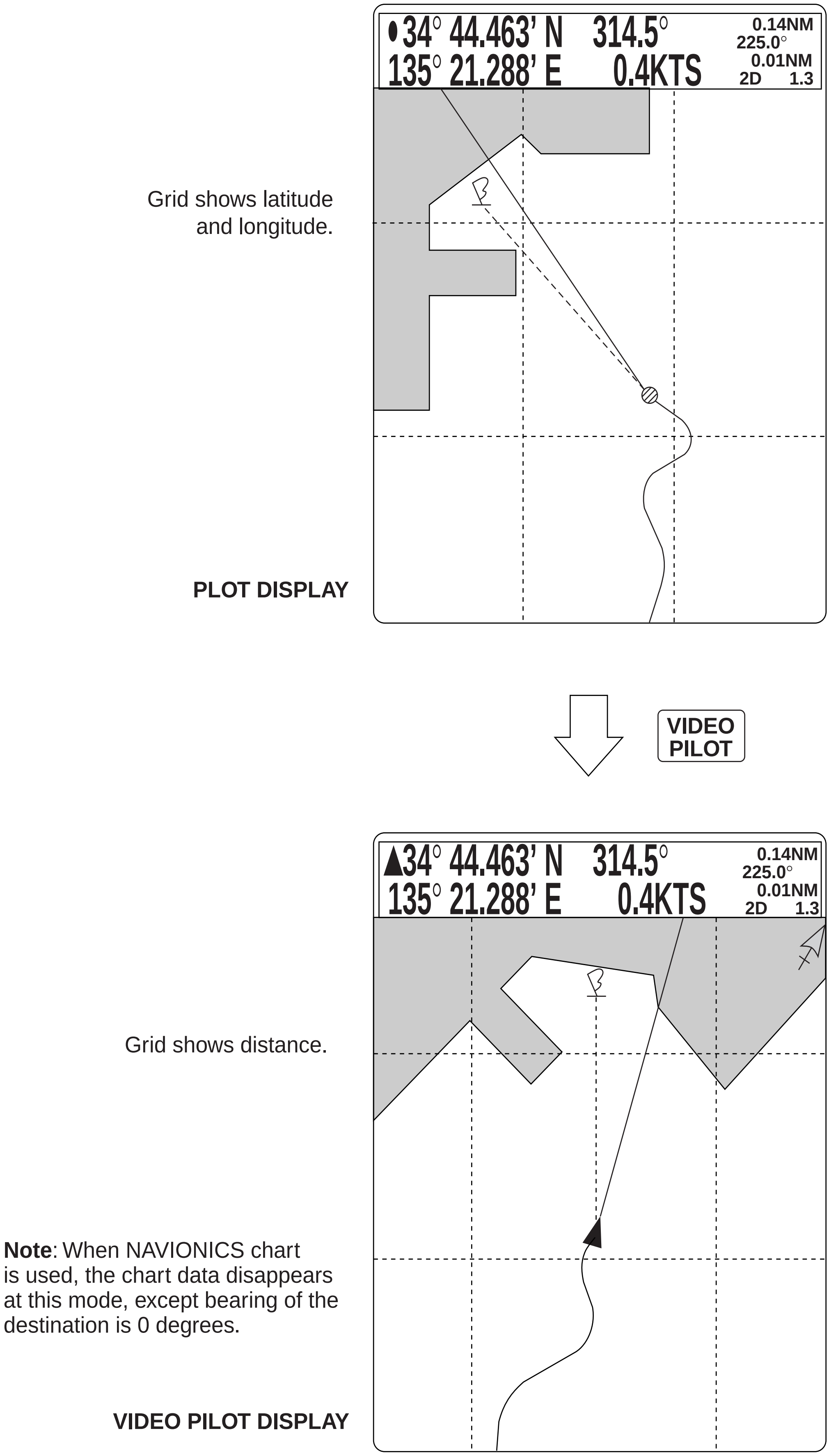
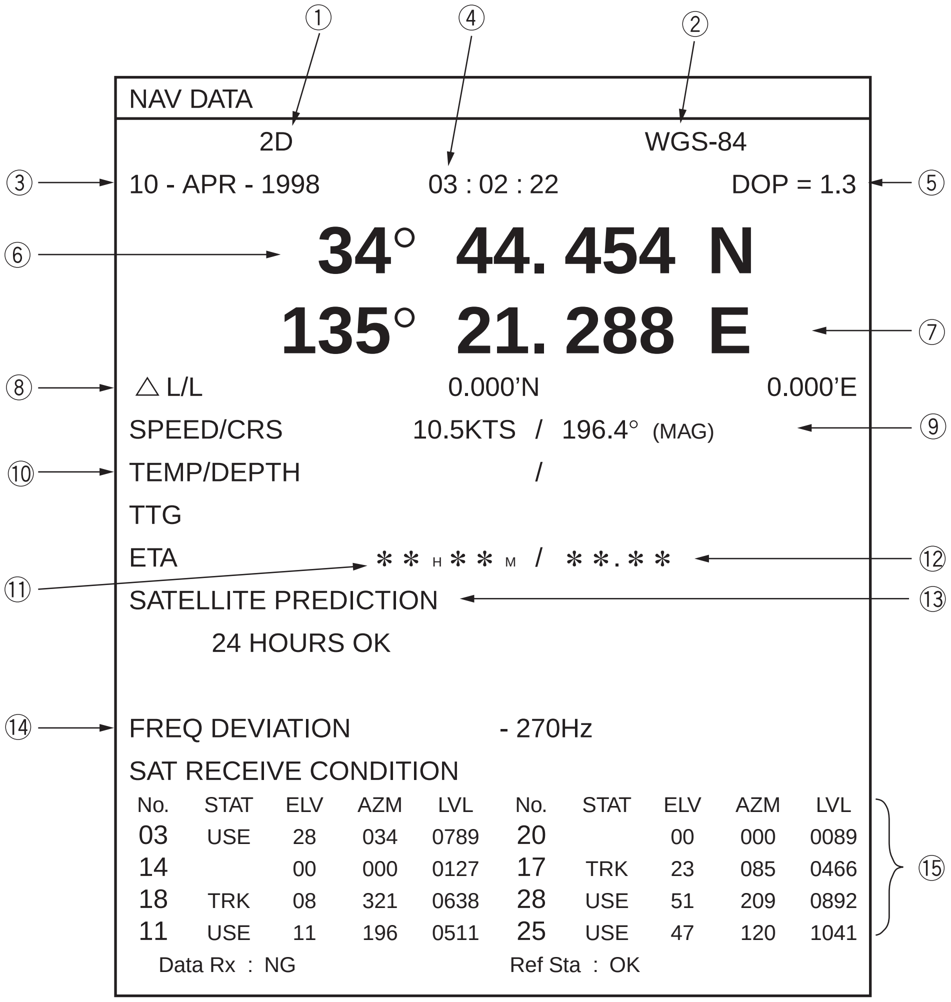


Figure 7-3 Sample plot and video pilot displays

7.2 Navigation Data Display

The navigation data display provides various navigation information, input by a navigation aid and sensors. You can display it by pressing the [NAV DATA] key.



① GPS receiver status
② Geodetic chart
③ Data
④ Time
⑤ DOP threshold
⑥ Latitude
⑦ Longitude
⑧ Position correction
⑨ Speed/course
⑩ Water temp/water depth
⑪ TTG to waypoint
⑫ ETA to waypoint
⑬ GPS satellite forecast
⑭ GPS receiver frequency deviation
⑮ Satellite receiving condition

Figure 7-4 Sample navigation data display

AUTOPILOT DATA

With autopilot connection, you can display various autopilot information on the display. This chapter describes what information you receive with autopilot connection.

8.1 Features Available with Autopilot Connection

The following features are available with autopilot (for example, FURUNO FAP-330) connection:

- The FAP-330 feeds autopilot information to the GD/GP-3300 for display on the plot and video pilot displays.
- In the AUTO mode the FAP-330 automatically controls rudder movement in order to steer the vessel on a set course, thereby negating the effects of wind and current.
- When you restart the NAV mode when navigating a route, a line is drawn between restart point and next intermediate route waypoint. See Figure 8-1.
- The autopilot display can be turned on or off on the INITIAL SETTINGS menu.

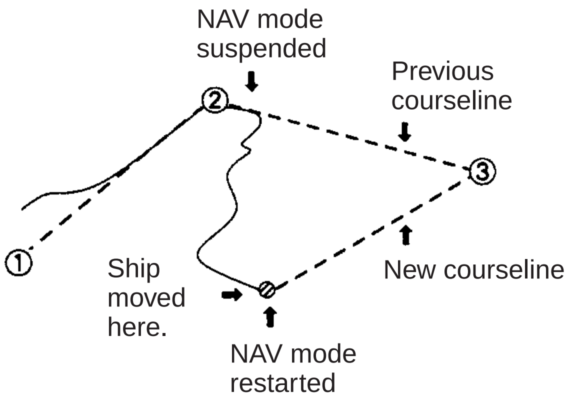


Figure 8-1 Courseline to next intermediate point drawn when NAV mode is restarted while navigating a route

8.2 Autopilot Information on Plot Display

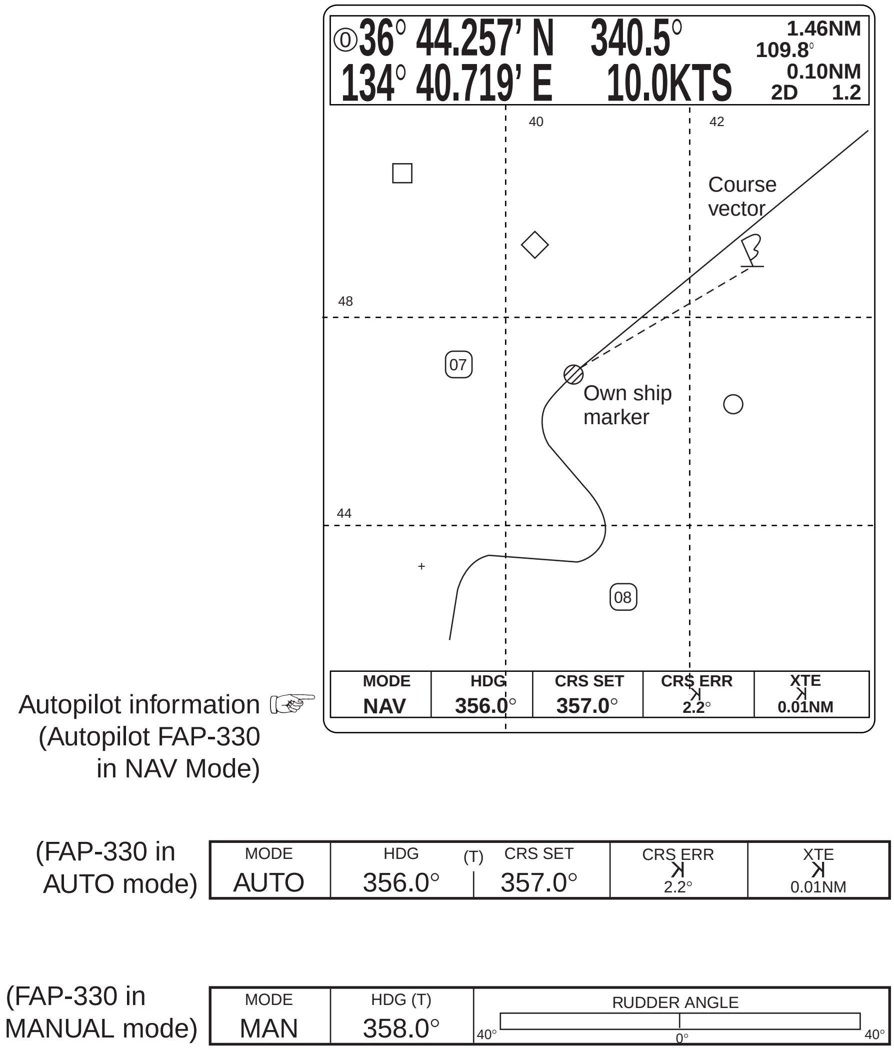


Figure 8-2 Sample autopilot information on plot display

8.3 Autopilot Information on Video Pilot Display

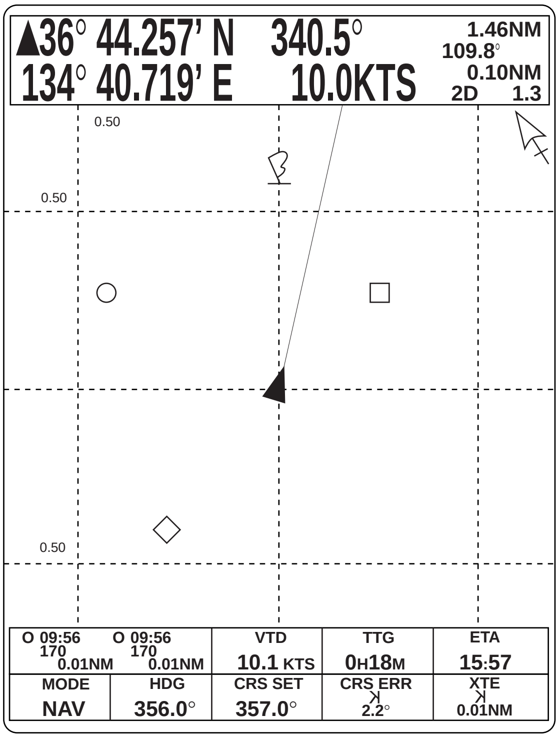


Figure 8-3 Sample autopilot information on video pilot display

Autopilot on, no destination waypoint selected

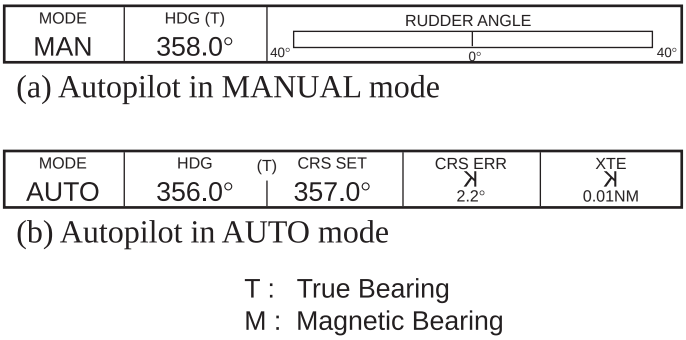


Figure 8-4 Autopilot information when autopilot is on, no destination waypoint selected

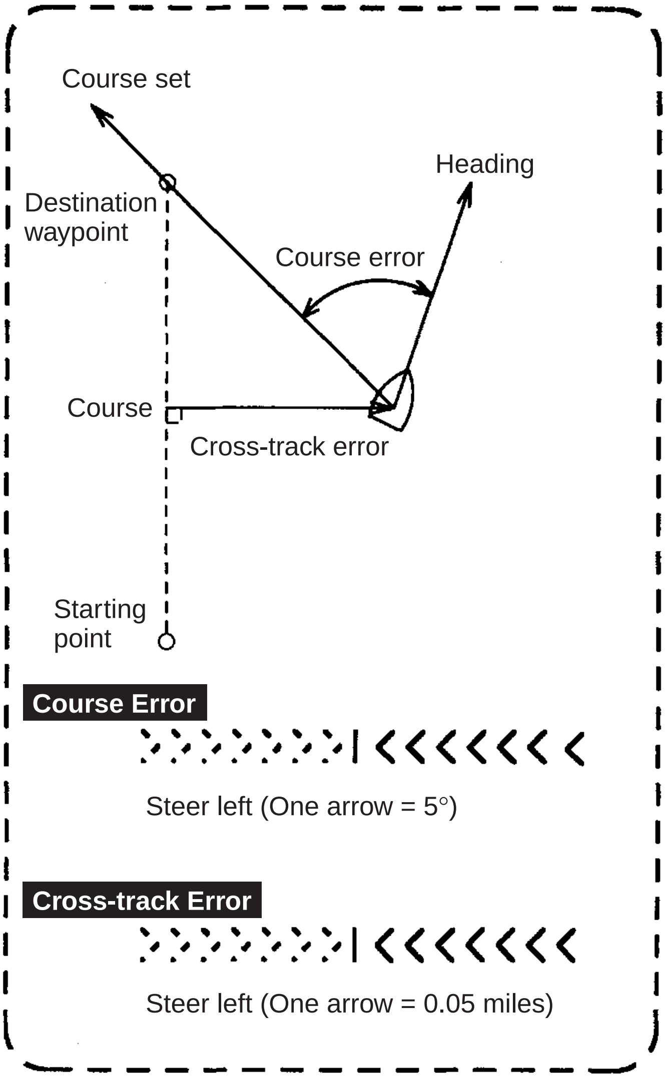
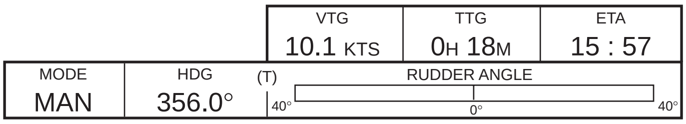
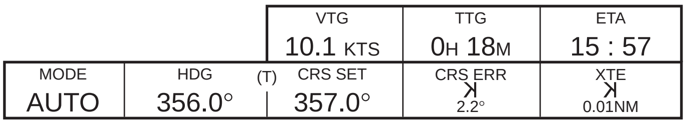


Figure 8-5 Course error and cross-track error indications

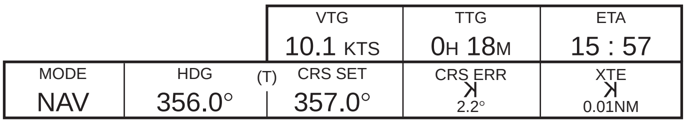
Autopilot on, destination waypoint selected



(a) Autopilot in MANUAL mode



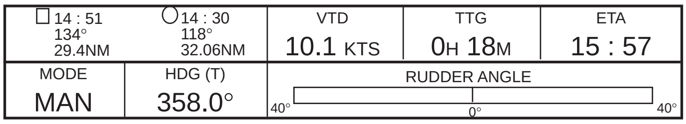
(c) Autopilot in AUTO mode



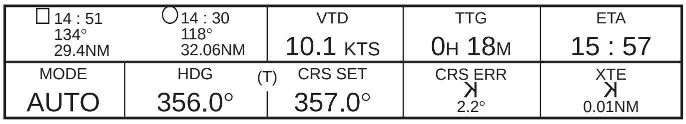
(c) Autopilot in NAV mode

Figure 8-6 Autopilot information when autopilot is on, destination waypoint selected

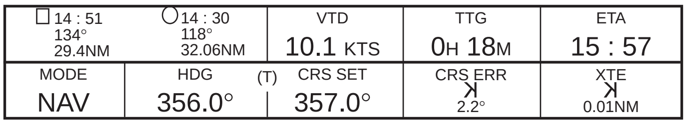
Autopilot on, mark entered, destination waypoint selected



(a) Autopilot in MANUAL mode



(b) Autopilot in AUTO mode



(c) Autopilot in NAV mode

Figure 8-7 Autopilot information when autopilot is on, mark entered, destination waypoint selected

Note: Mark data remains on the display even if associated marks are erased, until the next mark is entered.

MEMORY CARD OPERATIONS

9.1 Formatting Memory Cards

Before you can save information to a memory card you must prepare its surface by formatting it. Formatting is a routine procedure you must perform on new cards before you can use them with this unit. You have to initialize them only once. You can format cards you've used before, however, in which case all prior information on them is erased.

1. Insert a brand-new memory card into the upper card slot.
2. Press the [MENU] key.

MENU
1 WAYPOINT
2 ROUTE
3 SAVE DATA TO MEMORY CARD
4 LOAD MEMORY CARD
5 DISPLAY MEMORY CARD
6 CORRECT POSITION
7 APPORTION/DELETE MEMORY
8 INITIAL SETTINGS
9 MISC
SELECT BY USING NUMBER KEY.

Figure 9-1 Menu

3. Press the [3] key to select SAVE DATA TO MEMORY CARD.

3 SAVE DATA TO M.C.
1 TRACK
2 MARK/LINE
3 WAYPOINT/ROUTE
4 INITIAL SETTINGS
5
6
7 DELETE MEMORY CARD DATA
8 FORMAT MEMORY CARD
9 SELECT CARD SLOT
SELECT ITEM TO SAVE BY USING NUMBER KEY.

Figure 9-2 SAVE DATA TO M.C. menu

4. Press the [8] key to select FORMAT MEMORY CARD.

5. Press the [ENT] key.

"FORMATTING" appears on the display during formatting. "FORMATTING COMPLETED" appears upon completion of formatting. If the card could not be formatted, "FORMATTING FAILED" appears.

9.2 Saving Data to Memory Cards

You may save data (track, marks, lines and waypoints, routes) to a memory (RAM) card for storage and later replay. Two types of memory cards are available: 256KB and 512KB.

1. Open the card drive door and place a formatted memory card in the upper card slot.

2. Press the [MENU] key.

3. Press the [3] key to select SAVE DATA TO MEMORY CARD.

3 SAVE DATA TO M.C.
1 TRACK
2 MARK/LINE
3 WAYPOINT/ROUTE
4 INITIAL SETTINGS
5
6
7 DELETE MEMORY CARD DATA
8 FORMAT MEMORY CARD
9 SELECT CARD SLOT
SELECT ITEM TO SAVE BY USING NUMBER KEY.

Figure 9-3 SAVE DATA TO M.C. menu

4. Select the item you want to save by pressing appropriate numeric key: [1], track; [2], marks (including lines), [3], waypoints (including routes). Then, the menu related to the item selected for saving appears. Figure 9-4 shows the SAVE TRACK display.

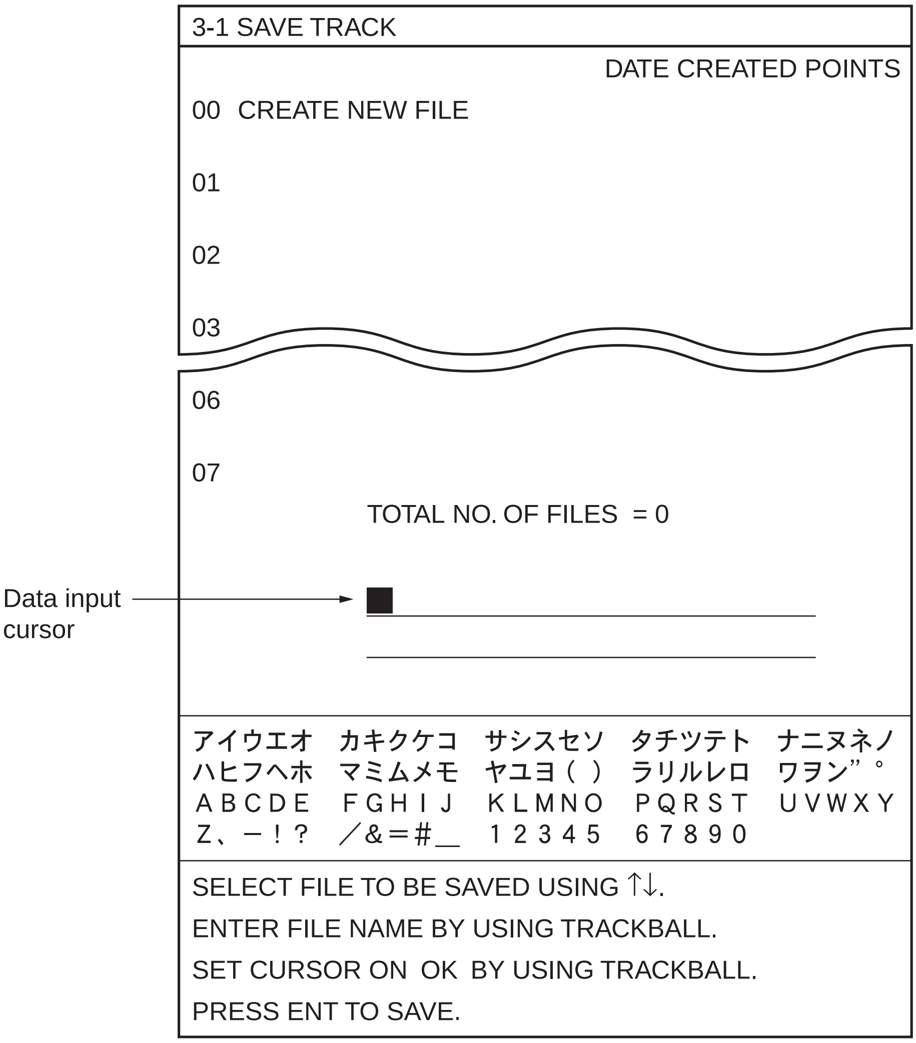
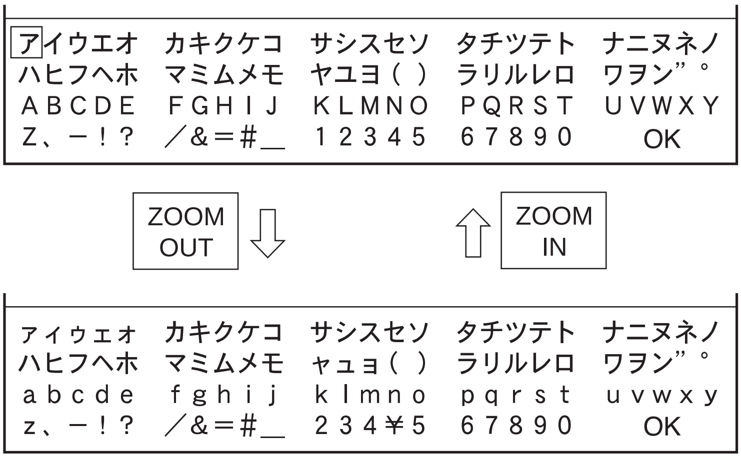


Figure 9-4 SAVE TRACK display

5. The red cursor should be on 00. This will save data to a new file. You may save data to an existing file name, in which case all previous data on that file will be deleted.

6. Assign a file name. The file name may contain 32 alphanumeric characters. You can switch between upper and lower case letters by operating the [ZOOM IN], [ZOOM OUT] keys.



(These are lower case characters.)

Figure 9-5 How to select upper and lower case letters

File name example

You enter a file name by selecting each character one by one with the arrow keys and pressing the [ENT] key after selecting each character. When you have finished entering the file name, select OK.

If you want to enter file name “FURUNO 1”, for example, do the following:

1. Place the cursor on “F” by operating the trackball.
2. Press the [ENT] key.
3. Place the cursor on “U”.
4. Press the [ENT] key.
5. Enter the characters “R”, “U”, “N” and “O” and “1” as you did “F” and “U”.
6. Place the cursor on “OK”.
7. Press the [ENT] key. SAVING” appears on the display during recording. “SAVING COMPLETED” appears upon completion of recording.

Note: The memory card contains a write-protection tab which prevents overwriting of information stored on the card. This prevents accidental erasure of important information. To write protect a memory card, set the write-protection tab rightward as shown in Figure 9-6.

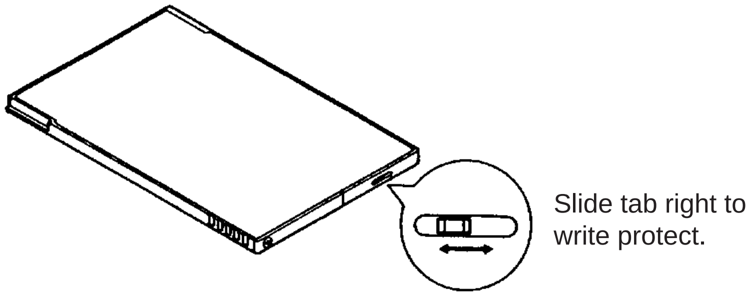


Figure 9-6 How to write protect a memory card

9.3 Playing Back Memory Cards

Up to eight files can be played back on the display. Note that marks and track currently displayed are not erased; they remain on the display together with played back file. Thus it is recommended that this feature be used only for editing card contents.

1. Insert a memory card into the upper card slot.
2. Press the [MENU] key to display the menu.

3. Press the [5] key to select DISPLAY MEMORY CARD.

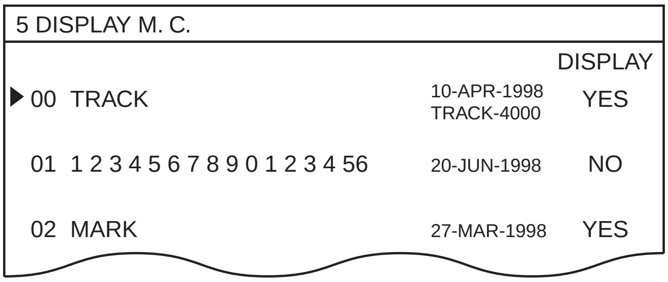


Figure 9-7 DISPLAY M.C. screen

4. Place the cursor on the file you want to display.
5. Press [+] to show “DISPLAY YES.”

   Note: If you more than eight files are selected to “DISPLAY YES,” place cursor on unnecessary file and press [-] to show “DISPLAY NO.”

6. Press the [ENT] key.
7. Press the [PLOT] key to return to the plot display.

9.4 Saving, Playing Back Initial Settings

You can save the contents of the INITIAL SETTINGS menu to a memory card, and play back the contents when desired. This is useful for maintaining several different sets of initial settings.

Saving initial settings

1. Open the card drive door and insert a memory card in the upper card slot.
2. Press [MENU] and [3] to display the SAVE DATA TO MEMORY CARD menu.
3. Press the [4] key to select INITIAL SETTINGS.
4. Press the [ENT] key.

Playing back initial settings

1. Open the card drive door and insert a memory card in the upper card slot.
2. Press [MENU] and [4] to display the LOAD DATA TO MEMORY CARD menu.
3. Press the [4] key to select INITIAL SETTINGS.
4. Press the [ENT] key.

9.5 Editing Memory Cards

Adding track, marks/lines

1. Press [MENU], [7] and [2] (track) or [3] (marks/lines) to confirm that there is sufficient memory remaining on the display.
2. Press the [MENU] key.
3. Press the [4] key to select LOAD MEMORY CARD.
4. Select the file you want to load and press the [ENT] key.
5. Save item loaded by pressing [MENU], [3], and then entering a file name.

Deleting track, marks/lines from a memory card

1. Press [MENU], [9], [8] and [1].
2. Press the [MENU] key.
3. Press [4] to select LOAD MEMORY CARD.
4. Select item to load.
5. Press [MENU], [9] and [1], and then delete the item you do not require.
6. Save item by pressing [MENU] and [3], and then assign a file name.

Deleting files

1. Press the [MENU] key.
2. Press the [3] key to select SAVE DATA TO MEMORY CARD.
3. Press the [7] key to select DELETE MEMORY CARD DATA.
4. Select file to delete.
5. Press [+] and [ENT].

GPS RECEIVER OPERATION (GP-3300)

10.1 GPS Information on the Navigation Data Display

The navigation data display, which is displayed with the [NAV DATA] key, shows GPS information, as well as navigation data.

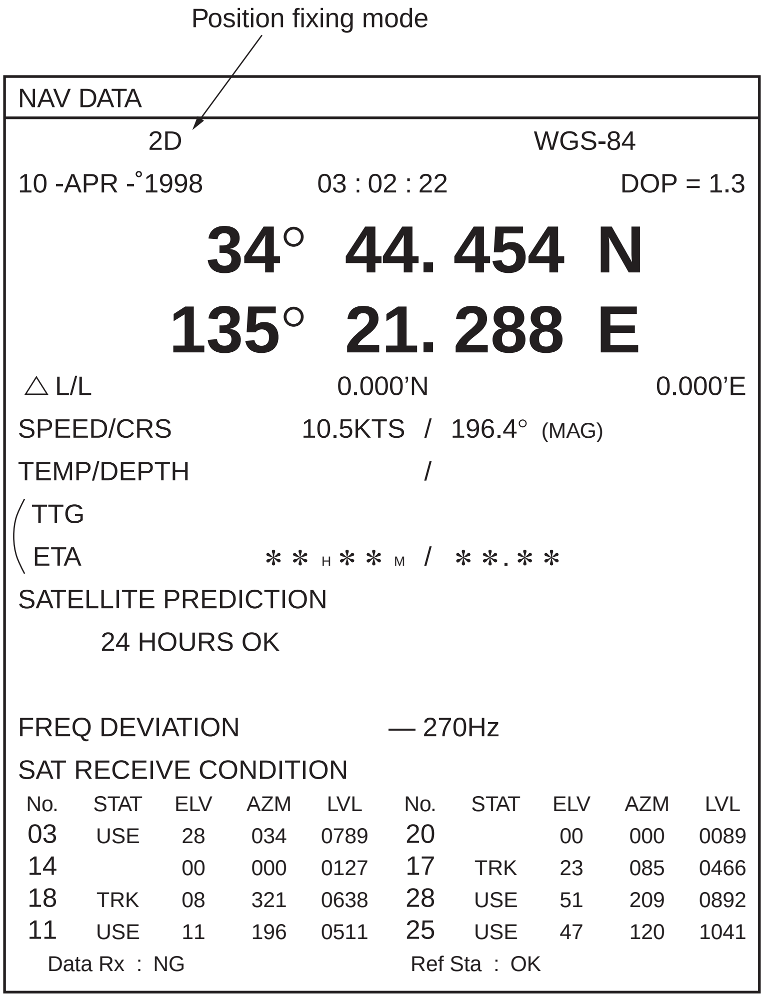


Figure 10-1 Sample navigation data display

GPS receiver status

Table 10-1 explains the meanings of GPS receiver status indications on the navigation data display.

Table 10-1 GPS indications on the navigation data display

Indication	Meaning
CST	COLD START. The GPS receiver was started up with no Almanac. This condition occurs when the power is turned on for the first time or when the GPS memory is cleared.
IMP	IMPOSSIBLE ro receive. The GPS receiver is receiving current Almanac because the existing one shows no satellites within line-of-sight of the GPS receiver.
ACQ	ACQUIRING a satellite. According to the Almanac in the GPS receiver, a satellite is available in line-of-sight, and the GP-3300 is aquiring it but has not received it yet. If the ACQ indication remains on the display for a long time without changing to "ALM" (see ALM below), the receiver section may be faulty. (You can do the self test to verify receiver condition.)
ALM	ALMANAC is being received. According to the Almanac in the GPS receiver, three (or four) satellites are not in line-of-sight. Therefore, the receiver is receiving the latest Almanac to fix its position.
INT	Position-fixing INTERRUPTED. Reception is interrupted due to objects around the GPS antenna, etc. According to the Almanac, HDOP is still superior to the HDOP threshold. When the lost satellite reappears, calculation of position will be resumed.

Satellite schedule

The satellite schedule shows predicted date and time when the GPS receiver can fix its position by receiving GPS satellites. The time varies according to DOP threshold and position-fixing mode set on the GPS INITIAL SETTINGS menu.

Example 1

Indication: “24 HOURS OK”. (Position fixes by GPS available round the clock.)

Example 2

1. 11:30

   (GPS position fixes available from current time to 11:30 of the same day)

2. 9/1 12:00 → 3:51

   (GPS position fixes available from 9/1 12:00 to 9/2 3:51)

3. 9/2 4:05 →

   (GPS position fixes available from 9/2 4:05 to 9/3 4:05.)

Frequency deviation

This indication shows how many Hertz the GPS receiver is deviating from its assigned frequency of 1575.42 MHz. Less than about 3000 Hz is normal. Any deviation higher than that will mean more time is required to fix position.

Satellite data

Satellite data is shown as follows:

NO: Satellite no.
MODE: Satellite receiving condition
(TRK, Now tracking; USE, Using for position fixing)
ELV: Satellite elevation angle
AZM: Satellite azimuth (bearing)
LVL: Signal level (200 or better to get position fixes)

10.2 GPS and DGPS Initial Settings

This section provides the information necessary for entering GPS initial settings.

1. Press [MENU] and [8].
2. Press [↑] to set the cursor on PAGE CHANGE (TO GPS INITIAL SETTINGS). The following display appears.

8 GPS INITIAL SETTINGS

PAGE CHANGE (TO INITIAL SETTINGS)					
▶ POSITION FIXING MODE	=	2D	3D	2D/3D	
GEODETIC DATUM	=	WGS-84	WGS-72	TOKYO	NAD
		EURO	AUST	MISC	(007)
HDOP THRESHOLD	=	20 (2~99)			
TIME DIFFERENCE	=	09:00			
LATITUDE	=	34° 00.	000’ N		
LONGITUDE	=	135° 00.	000’ E		
DELTA LATITUDE	=	00. 000’	N		
DELTA LONGITUDE	=	00. 000’	E		
SMOOTHING	=	00~00	L/L-SPEED (0~99)		
ANTENNA HEIGHT	=	005 M			
COLD START	=	NO	YES		
CST SATELLITE NO.	=	07			
MIN. ELEVATION ANGLE	=	05° (5~9)			
DESELECT SAT NO.	=	– –			
D.GPS MODE	=	ON	OFF		
RTCM VER	=	1.0	2.0		
BYTE FORM	=	8-6	8-8		
FIRST BIT	=	MSB	LSB		
PARITY BIT	=	EVEN	ODD	NONE	
STOP BIT	=	1	2		
BIT RATE	=	7	8		
BAUD RATES	=	300	600	1200	
		2400	4800	9600	

⬆⬇ : SELECT ITEM
➡⬅ : SELECT PARAMETER
PROGRAM NO. : 48501050xx

Figure 10-2 GPS INITIAL SETTINGS menu

GPS initial settings menu description

Table 10-2 describes the GPS INITIAL SETTINGS menu.

Table 10-2 Description of GPS INITIAL SETTINGS menu

Item	Description
POSITION FIXING MODE	Selects position fixing mode. 2D: Position fixing by three satellites in line-of-sight of GPS receiver. 3D: Position fixing by four satellites in line-of-sight of GPS receiver. Position-fixing availability shorter than 2D but highter accuracy. 2D/3D: Position fixing by 2D or 3D (3D when available).
GEODETIC DATUM	Selects geodetic datum system. WGS-84 (Standard chart system for GPS) WGS-72 (Worldwide chart system) TOKYO NAD (North America 1992) EURO (European 1950) AUST (Australian Geodetic 1984) MISC (See page 10-9.)
HDOP THRESHOLD	Index for position-fixing accuracy. When the HDOP threshold is lower than the preset HDOP, the indication “2D” is replaced by “DOP” to show that position-fixing accuracy is poor. The default setting is 20, which is suitable for most all conditions.
TIME DIFFERENCE	GPS uses UTC time (world time standard). If you would rather display satellite schedule in local time, enter time difference between UTC and local time. If local time is earlier than UTC time enter a minus sign before entering time difference.
LATITUDE	For entering ship’s estimated latitude at cold start.
LONGITUDE	For entering ship’s estimated longitude at cold start.
DELTA LATITUDE	Enters difference between displayed latitude and chart position. The icon “L/L” appears at the bottom right-hand corner when delta latitude is being used.
DELTA LONGITUDE	Enters difference between displayed latitude and chart position. The icon “L/L” appears at the bottom right-hand corner when delta longitude is being used.
SMOOTHING	Changes difference between to eliminate errors in GPS position due to changes of speed and course.
ANTENNA HEIGHT	Enters antenna height above the waterline.
COLD START	Manually cold starts the GPS receiver to receive the Almanac. (Cold start is automatically done after clearing the GPS memory or at initial power application after installation.)
CST SATELLITE NO.	Manually selects satellite to use for cold start, to reduce time required to complete cold start.

(Continued on next page)

Item	Description
MIN. ELEVATION ANGLE	Enters minimum angle above the horizon a satellite must be positioned to use it for fixing position. The default setting is five degrees.
DESELECT SAT NO.	Every GPS satellite is broadcasting abnormal satellite number(s) in the Almanac. Using this infomation the GPS receiver eliminates any malfunctioning satellite from the GPS satellite schedule. Once the malfunctioning satellite is returned to on-line status it is automatically restored to the satellite schedule when the Almanac is received. In some instances however the Almanac may not contain information which announces that a satellite is now back on line. If you hear of this through another source, you can manually restore the satellite to the satellite schedule. This is called “Forced Health.” Conversely, you can manually “Deselect” a healthy satellite if you hear it is “unhealthy.” To force health or deselect a satellite see the procedure below.
D.GPS MODE	Select normal mode or DGPS mode. When you select DGPS ON, set the items below referring to the DGPS Beacon Receiver's operator's manual.
RTCM VERSION, BYTE FORM, FIRST BIT, PARITY BIT, STOP BIT, BIT RATE, BAUD RATE	Set according to DGPS Beacon Receiver connected.

10.3 Satellite Force Health/Deselection

1. Press [MENU] and [8], and then press [↑] to set the cursor on PAGE CHANGE (TO GPS INITIAL SETTINGS).
2. Set the cursor on DESELECT SATELLITE NO. The display should look something like Figure 10-3.

Satellite condition (NONE, No satellite; OK, Satellite in use; NG, No Good)

01 : NONE	( )	02 : OK	(DESELECT)	01 : OK	(FORCED)
04 : NONE	( )	05 : NONE	( )	04 : NG	( )
07 : NONE	( )	08 : NONE	( )	07 : OK	( )
10 : NONE	( )	11 : OK	( )	10 : OK	( )
13 : OK	( )	14 : OK	( )	13 : OK	( )
16 : OK	( )	17 : OK	( )	16 : OK	( )
19 : OK	( )	20 : OK	( )	19 : OK	( )
22 : NONE	( )	23 : OK	( )	22 : OK	( )
25 : OK	( )	26 : OK	( )	25 : OK	( )
28 : OK	( )	29 : NONE	( )	28 : NONE	( )
31 : NONE	( )	32 : NONE	( )	31 : NONE	( )

Satellite NO.

Figure 10-3 Sample satellite selection display

2. Enter satellite number using two digits.

3. Press the [ ] key to display desired option. Each press of the key deletes item in parentheses (namely, enables the satellite) or displays DESELECT or FORCED.

4. Press the [ENT] key.

10.4 GPS Smoothing

Latitude and longitude GPS smoothing

When the DOP or receiving condition is unfavorable, the GPS fix may change greatly, even if the vessel is dead in water. This change can be reduced by smoothing the raw GPS fixes. A setting between 0 and 9 is available. The higher the setting the more smoothed the raw data. Note however that too high a setting slows response time to change in latitude and longitude. This phenomenon is especially noticeable at high ship's speeds. "0" is the normal setting; increase the setting if the GPS fix changes greatly.

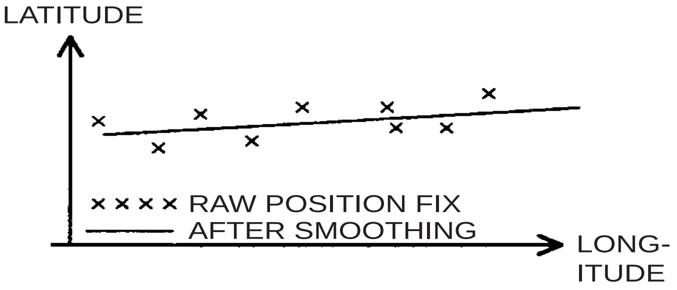


Figure 10-4 Latitude and longitude GPS smoothing

Speed and course GPS smoothing

During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing setting the more smoothed the raw data. If the setting is too high, however, the response to speed and course changes slows. For no smoothing, enter "0". "5" is suitable for most conditions.

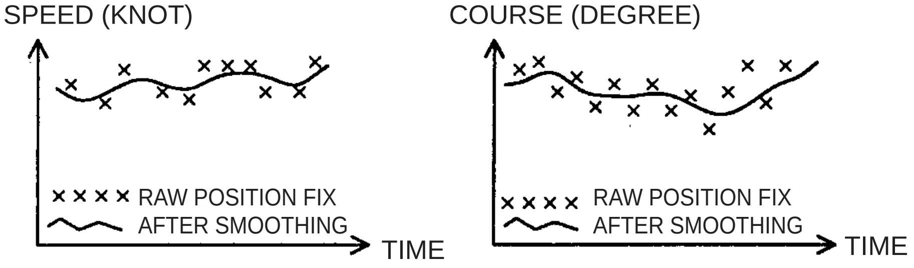


Figure 10-5 Speed and course GPS smoothing

Setting GPS smoothing

The default GPS smoothing settings are suitable for most all conditions. If change of the default settings is necessary, do the following

1. Press [MENU] and [8], and then press [↑] to set the cursor on PAGE CHANGE (TO GPS INITIAL SETTINGS). The following display appears.

GPS INITIAL SETTINGS					
PAGE CHANGE (TO INITIAL SETTINGS)					
▶ POSITION FIXING MODE	=	[2D]	3D	2D/3D	
GEODETIC DATUM	=	[WGS-84]	WGS-72	TOKYO	NAD
		EURO	AUST	MISC	(007)
HDOP THRESHOLD	=	20 (2~99)			
TIME DIFFERENCE	=	09:00			
LATITUDE	=	34° 00.	000	N	
LONGITUDE	=	135° 00.	000	E	
DELTA LATITUDE	=	00. 000	N		
DELTA LONGITUDE	=	00. 000	E		
SMOOTHING	=	00~00	L/L-SPEED (0~99)		
ANTENNA HEIGHT	=	030 M			
COLD START	=	[NO]	YES		
CST SATELLITE NO.	=	01			
MIN. ELEVATION ANGLE	=	05° (5~9)			
DESELECT SAT NO.	=	— —			

Figure 10-6 GPS INITIAL SETTINGS menu

2. Set the cursor on SMOOTHING.
3. Enter latitude and longitude smoothing time from 0 - 99 minutes in two digits.
4. Enter speed and course smoothing time from 0 - 99 seconds in two digits.
5. Press the [ENT] key.

10.5 Cold Start

Cold start is automatically executed at initial power application or when the GPS memory is cleared. This is done to acquire the Almanac to receive a GPS satellite. You can also do the cold start manually when the Almanac is too old to acquire a satellite; for example, when the unit has not been used for about six months. Manually cold starting the GPS receiver erases the existing Almanac to receive the current one.

1. Press [MENU] and [8], and then press [↑] to set the cursor on PAGE CHANGE (TO GPS INITIAL SETTINGS).

GPS INITIAL SETTINGS					
PAGE CHANGE (TO INITIAL SETTINGS)					
▶ POSITION FIXING MODE	=	2D	3D	2D/3D	
GEODETIC DATUM	=	WGS-84	WGS-72	TOKYO	NAD
		EURO	AUST	MISC	(007)
HDOP THRESHOLD	=	20 (2~99)			
TIME DIFFERENCE	=	09:00			
LATITUDE	=	34° 00.	000	N	
LONGITUDE	=	135° 00.	000	E	
DELTA LATITUDE	=	00. 000	N		
DELTA LONGITUDE	=	00. 000	E		
SMOOTHING	=	00~00	L/L-SPEED (0~99)		
ANTENNA HEIGHT	=	030 M			
COLD START	=	NO	YES		
CST SATELLITE NO.	=	01			
MIN. ELEVATION ANGLE	=	05° (5~9)			
DESELECT SAT NO.	=	— —			

Figure 10-7 GPS INITIAL SETTINGS menu

2. Select LATITUDE. Enter ship's latitude to within the accuracy of ±10°.
3. Select LONGITUDE. Enter ship's longitude to within the accuracy of ±10°.
4. Select ANTENNA HEIGHT and then enter antenna height above the waterline. To enter 15 meters, for example, press [0], [1] and [5].
5. If you know a satellite which is in line-of-sight, enter its number in the CST SATELLITE NO. field. This will reduce the time required to complete the cold start.
6. Select YES from the COLD START field.
7. Press the [ENT] key.

8. Press the [NAV DATA] key to display the navigation data display.

The indication “CST” appears at the top of the display. When cold start is completed, “CST” is replaced by “2D” or “ACQ.” Cold start takes about two minutes to complete.

10.6 Geodetic Datum

A nautical chart is usually made by either trigonometrical survey or astronomical survey and according to the geodetic chart standards of the country it is used in. For example, the USA uses the system called Clarke; India, Everest, and Japan, Bessel. Accordingly when you are getting position fixes by GPS in the USA, the system should be Clarke so you don’t get a position fix which shows you’re somewhere offshore when you’re actually moored to a dock.

While the use of one category of chart systems is fine if you don’t do transoceanic voyages, ocean-going vessels may require all categories to get reliable position information. To solve this inconvenience, a standard chart system was adopted by GPS: the WGS-84.

Selecting chart system

Although the WGS-84 system is now widely used the other categories of charts still exist. Thus it is necessary to apply a correction value to the WGS-84 to match it to local geodetic systems.

The GD/GP-3300 can perform this calculation automatically if you tell it what type of chart you’re using. For Clarke charts, for example, select NAD (North America 1992). Select the chart system used, not the area where the boat is sailing.

10.7 Correcting GPS Position

You may apply an offset to GPS position to further refine its accuracy.

1. Press [MENU] and [8], and then press [↑] to set the cursor on PAGE CHANGE (TO GPS INITIAL SETTINGS).
2. Select DELTA LATITUDE and enter latitude offset.
3. Select DELTA LONGITUDE and enter longitude offset.
4. Press the [ENT] key.
5. Press the [MENU] key.

11.1 Displaying Position in Loran TDs

You can display own ship’s position and cursor position in Loran A or Loran C TDs, as well as latitude and longitude. This function does not require connection of a Loran receiver; Loran chain information is stored in the unit.

Once Loran A or Loran C chain information is entered you can alternately display Loran A or C TDs (depending on which is selected for display) and latitude and longitude by pressing the [ ] key.

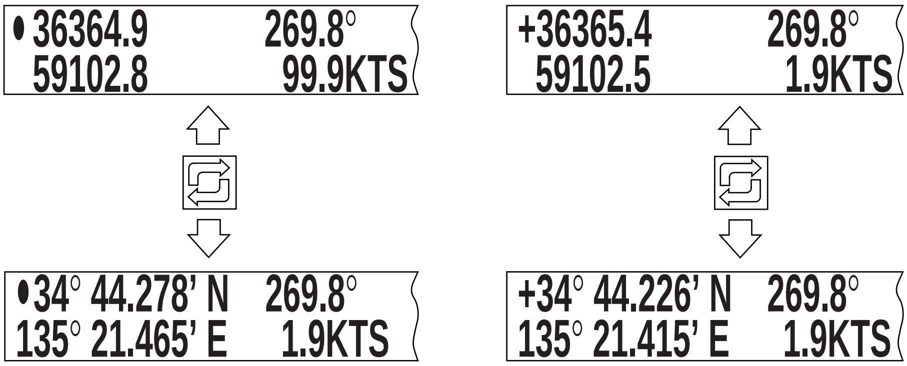


Figure 11-1 How to switch between Loran TDs and latitude and longitude indications

Displaying position in Loran A TDs

1. Press [MENU] and [8] to display the INITIAL SETTINGS menu.

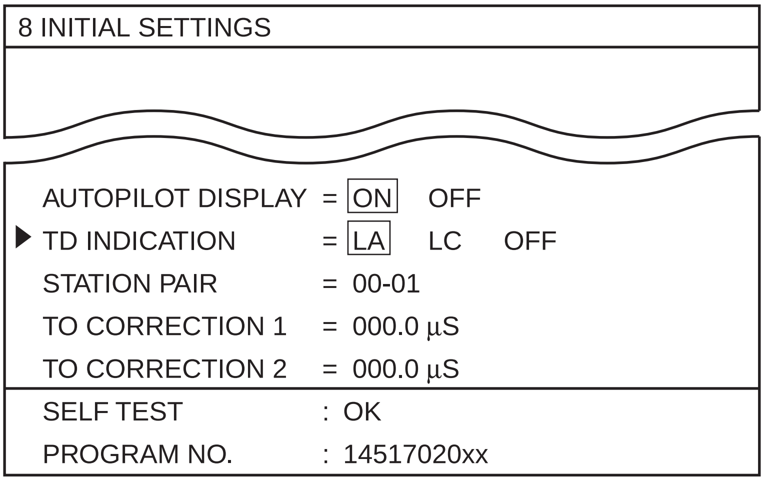


Figure 11-2 INITIAL SETTINGS menu

2. Select TD INDICATION.

3. Select LA.
4. Select STATION PAIR, and station pair codes list appears.

00: 1L0	01: 1L1	02: 1L4	03: 1L5	04: 1L6
05: 1L7	06: 1S1	07: 1S2	08: 1S3	09: 1S4
10: 1S6	11: 2H3	12: 2H4	13: 2H5	14: 2H6
15: 2S0	16: 2S1	17: 2S2	18: 2S3	19: 2S4
20: 2S5	21: 2S6	22: 2S7		

5. Enter station pair codes.
6. Press the [ENT key].

Displaying position in Loran C TDs

To display ship's position in Loran C TDs;

1. Press [MENU] and [8] to display the INITIAL SETTINGS menu.
2. Select TD INDICATION.
3. Select LC.
4. Select STATION PAIR, and GRI code number list appears.

00: 7970	01: 9960	02: 7980	03: 8970
04: 9940	05: 5990	06: 7960	07: 9990
08: 4990	09: 9970	10: 7990	11: 5930
12: 5970	13: 7930	14: 9980	15: 7950
16: 7170	17: 8990	18: 8000	19: 9610
20: 8290			

5. Enter GRI code number.
6. Station pair code appears for the GRI selected. Enter station pair code.

   00: 11000 01: 26000 02: 46000 03: 60000

7. Press the [ENT] key.

11.2 Bearing Display Reference

A navigation device outputs both true and magnetic bearings. A magnetic bearing is true bearing plus (or minus) earth's magnetic deviation. Thus the equation for finding magnetic bearing is;

true bearing ± x (magnetic variation)° = magnetic bearing

You can display your ship's course and bearing to waypoint in true or magnetic bearing.

Displaying true bearing

1. Press [MENU] and [8].

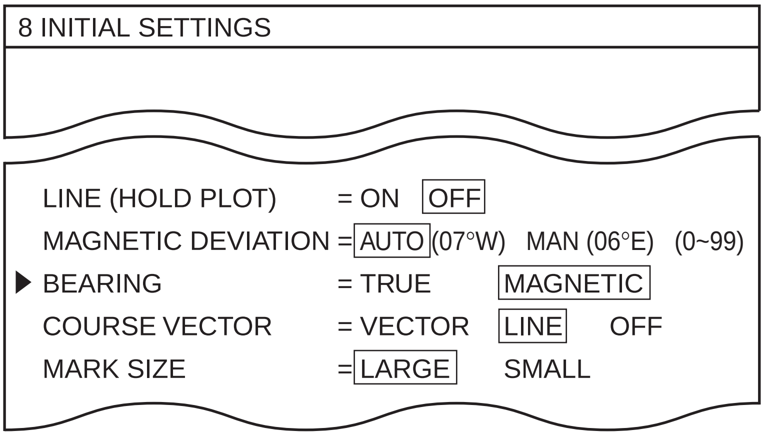


Figure 11-3 INITIAL SETTINGS menu

3. Select BEARING.

4. Select MAGNETIC or TRUE as appropriate.

5. Press the [ENT] key.

   The bearing display in the data window (DATA DISPLAY (2)) shows “M” when you are using magnetic bearing.

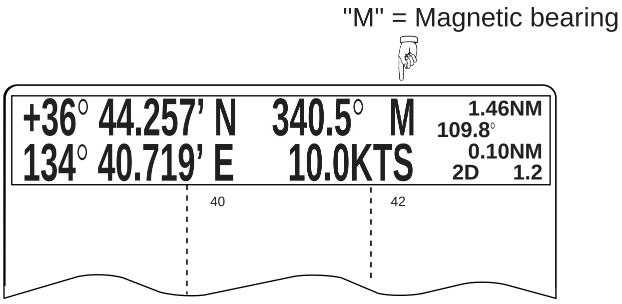


Figure 11-4 Location of magnetic bearing indication on DATA DISPLAY (2)

11.3 Magnetic Deviation

The magnetic deviations for all areas of the earth are preprogrammed into this unit. The preprogrammed variation is accurate for most instances, however you may wish to manually enter a variation.

1. Press [MENU] and [8].

2. Select BEARING.

3. Select MAGNETIC DEVIATION.

4. Select MANual.

5. Enter magnetic deviation; magnetic deviation value and plus for East and minus for West. If the magnetic deviation is plus 6°E, for example, press [0], [6] and [+].

6. Press the [ENT] key.

11.4 Changing Chart Appearance

This section describes how to change chart appearance, for example, change color and brightness of background, turn grid lines on or off, etc. This is applicable to both FURUNO and NAVIONICS chart cards.

1. Press the [CHART] key to display the GEODETIC DATUM menu.

```
GEODETIC DATUM
 ▶ LAND DENSITY       = 1  2  3  4  0 (OFF)
   LAND COLOR         = 1  2  3  4  5  6  7
   PLACE-NAME         = ON          OFF
   GRID               = ON          OFF
   BACKGROUND COLOR   = 1  2  3  4  5  6  7  0 (OFF)
   BACKGROUND BRT     = HIGH        LOW
```

Figure 11-5 GEODETIC DATUM menu

2. Select options as appropriate. Table 11-1 describes the GEODETIC DATUM menu.

Table 11-1 GEODETIC DATUM menu description

Menu Item	**Function**
LAND DENSITY	Selects land brightness; 1 for highest, 0 for none.
LAND COLOR	Selects land color among seven colors.
PLACE-NAME	Turns geographic place-name display on/off.
GRID	Turns grid on/off.
BACKGROUND COLOR	Select background color among seven colors and off.
BACKGROUND BRT	Selects background brightness for high or low.

3. Press the [ENT] key.

11.5 Correcting Chart Position

There may be some instances where the chart latitude and longitude position are off by some seconds. You can compensate for this error. You may correct chart position three ways: by cursor, by latitude and longitude, by Delta L/L.

When you apply an offset to chart position the L/L icon appears at the bottom right-hand corner on the display.

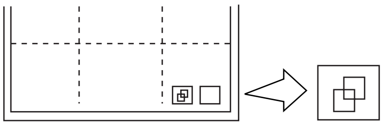


Figure 11-6 Icon shown when chart offset is applied

Correcting chart position by cursor

To correct chart position by the cursor;

1. Press the [MENU] key followed by the [6] key to display the CORRECT POSITION screen.

```
6 CORRECT POSITION

  POS CORR  = [YES]      NO
▶ MODE      = [CURSOR]   L/L    △L/L
  LATITUDE  =   **° **.*** 'N  (**.*** 'N)
  LONGITUDE = ***° **.*** 'E  (**.*** 'E)

SET CURSOR ON CORRECT POSITION AND PRESS
ENT TO DISPLAY △L/L.
PRESS ENT AGAIN TO REGISTER.
```

Figure 11-7 CORRECT POSITION menu

2. Select YES.
3. Select CURSOR from the MODE line.
4. Operate the trackball to set the cursor on correct latitude and longitude position.
5. Press the [ENT] key to display Δ L/L.
6. Press the [ENT] key again to register.

Correcting chart position by latitude and longitude

You can correct chart position by manually entering latitude and longitude corrections.

1. Press the [MENU] key followed by the [6] key to display the CORRECT POSITION screen.

```
6 CORRECT POSITION

   POS CORR   = [YES]        NO
 ▶ MODE       =  CURSOR    [L/L]   △L/L
   LATITUDE   =   – – °  – – . – – – 'N   (∗ ∗ .∗ ∗ ∗  'N)
   LONGITUDE  = – – – °  – – . – – – 'E   (∗ ∗ .∗ ∗ ∗  'E)

SET CORRECT L/L POSITION THROUGH KEYBOARD
AND PRESS ENT TO DISPLAY △L/L.
PRESS ENT AGAIN TO REGISTER.          + : N, E   – : S, W
```

Figure 11-8 CORRECT POSITION menu

2. Select YES from the POS CORR field.
3. Select L/L from the MODE field.
4. Enter latitude and longitude corrections in the LATITUDE and LONGITUDE fields.
5. Press the [ENT] key to display Δ L/L.
6. Press the [ENT] key again to register.

Corrections chart position by Δ (Delta) L/L

Follow the procedure below to correct chart position by Delta L/L.

1. Press the [MENU] key followed by the [6] key to display the CORRECT POSITION screen.

```
6 CORRECT POSITION

   POS CORR   = [YES]        NO
 ▶ MODE       =  CURSOR     L/L  [△L/L]
   DELTA LAT  =  – – °  – – . – – – 'N
   DELTA LONG =  – – °  – – . – – – 'E

ENTER L/L CORRECTION VALUE THROUGH KEYBOARD.

                                       + : N, E   – : S, W
```

Figure 11-9 CORRECT POSITION menu

2. Select YES from the POS CORR field.
3. Select Δ L/L from the MODE field.
4. Enter latitude and longitude correction values.
5. Press the [ENT] key.

Cancelling chart position correction

1. Press [MENU] and [6].
2. Select NO from the POS CORR field.
3. Press the [ENT] key.

11.6 Loran TD Correction

When the Loran A or Loran C TD display shows constant error you can correct it as follows:

1. Press the [MENU] key.

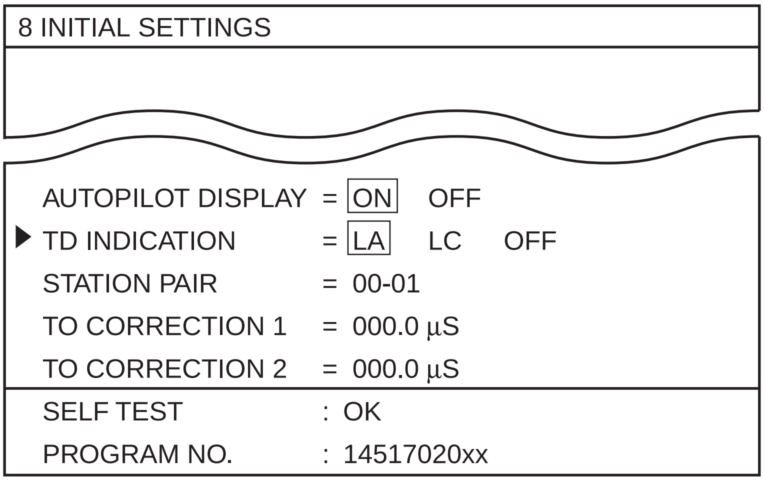


Figure 11-10 INITIAL SETTINGS menu, lower half

2. Press the [8] key to display the INITIAL SETTINGS menu.
3. Select TD CORRECTION 1.
4. Enter TD correction value in microseconds. If the value is -0.1 microseconds, for example, press [0], [0], [0], and [1].
5. Select TD CORRECTION 2 and enter TD correction value in microseconds.
6. Press the [ENT] key.

11.7 Calculating R/B Between Two Points

You can calculate the range and bearing between any two points. Three methods are available: by latitude and longitude, by cursor, and by waypoint numbers.

Calculating R/B by latitude and longitude

To calculate the range and bearing between latitude and longitude points;

1. Press [MENU], [9], and [2] to display the CALCULATE RANGE/ BEARING menu.

```
9-2 CALCULATE RANGE/BEARING

 ▶ MODE       = CURSOR   [L/L]   WAYPOINT
   START PT : – – °  – – . – – – ’  N – – °  – – . – – – ’  E
   STOP PT  : – – °  – – . – – – ’  N – – °  – – . – – – ’  E
   RANGE    : – – – – . – – NM   BEARING : – – – .– °          ☜ Calculation results
------------------------------------------------------------
ENTER L/L START AND STOP POINTS.
PRESS CLR TO CALCULATE ANOTHER R/B.
```

Figure 11-11 CALCULATE RANGE/BEARING menu

2. Select L/L from the MODE field.
3. Select the START PT line.
4. Enter latitude and longitude of start point.
5. Select the STOP PT line.
6. Enter latitude and longitude of stop point.
7. Press the [ENT] key. The calculation results appear.

Calculating R/B by latitude and longitude

You can calculate the range and bearing between two points by using the cursor to designate the two points.

1. Press [MENU], [9] and [2] to display the CALCULATE RANGE/ BEARING menu.

```
9-2 CALCULATE RANGE/BEARING

▶ MODE       = [CURSOR]    L/L    WAYPOINT
  START PT : – – °  – – . – – – ’  N – – °  – – . – – – ’  E
  STOP PT  : – – °  – – . – – – ’  N – – °  – – . – – – ’  E
  RANGE    : – – – – . – – NM   BEARING : – – – .– °
--------------------------------------------------------------
SELECT START AND STOP POINTS BY USING CURSOR,
PRESSING ENT AFTER EACH POINT.
PRESS CLR TO CALCULATE ANOTHER R/B.
```

☜ Calculation results

Figure 11-12 CALCULATE RANGE/BEARING menu

2. Select CURSOR from the MODE field.
3. Operate the trackball to select start point and then press ENT. A green square marks start point.
4. Operate the trackball to select stop point and then press ENT. A solid green line connects start and stop points and the calculation results appear on the menu.

Calculating R/B by waypoint numbers

To find the range and bearing between two registered waypoints;

1. Press [MENU], [9] and [2] to display the CALCULATE RANGE/ BEARING menu.

```
9-2 CALCULATE RANGE/BEARING

▶ MODE       = CURSOR    L/L    [WAYPOINT]
  START PT = – –
  STOP PT  = – –
  RANGE    : – – – – . – – NM   BEARING : – – – .– °
--------------------------------------------------------------
ENTER START AND STOP WAYPOINT NUMBERS.
PRESS CLR TO CALCULATE ANOTHER R/B.
```

☜ Calculation results

Figure 11-13 CALCULATE RANGE/BEARING menu

2. Select WAYPOINT from the MODE field.

3. Enter start and stop waypoints by using arrow keys and numeric keys.

4. Press the [ENT] key. The calculation results appear on the menu.

11.8 Locking Preferred Settings

The GD/GP-3300 provides various methods for entering and selecting destination waypoint, waypoint and other items. Once you find the method you prefer you may want to lock it to have it automatically selected. This section shows how to do this.

When you lock settings the following functions are not available:

- Selection of method to enter waypoint, destination waypoint, route, and perform range and bearing calculation
- Chart correction (menu 6)
- Memory apportion (menu 7)
- Initial settings (menu 8)
- Self test (menu 9-9)

Locking or unlocking preferred settings

While pressing and holding down the [MENU] key, turn on the power. Release the [MENU] key when the plot display (or video pilot display) appears.

11.9 Memory Capacity

The default memory arrangement is as shown in Figure 11-14.

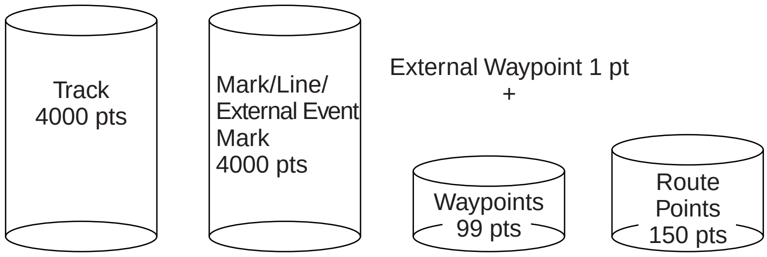


Figure 11-14 Default memory arrangement

The track and memory capacity includes current or loaded track and current or loaded marks.

- Current track: Position input by navigator
- Current mark: Mark input through keyboard
- Loaded track/mark: Track/mark loaded from a memory card

Note: Waypoints loaded from a memory card are erased if they share the same waypoint numbers as current waypoints.

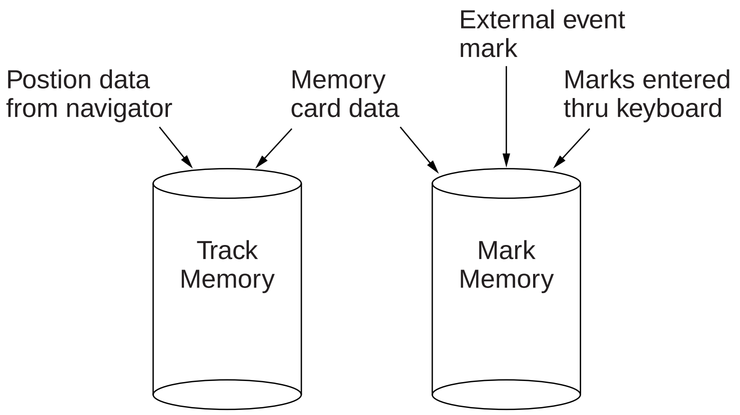


Figure 11-15 Contents of track and mark memories

Track memory

When the track memory becomes full oldest track is deleted.

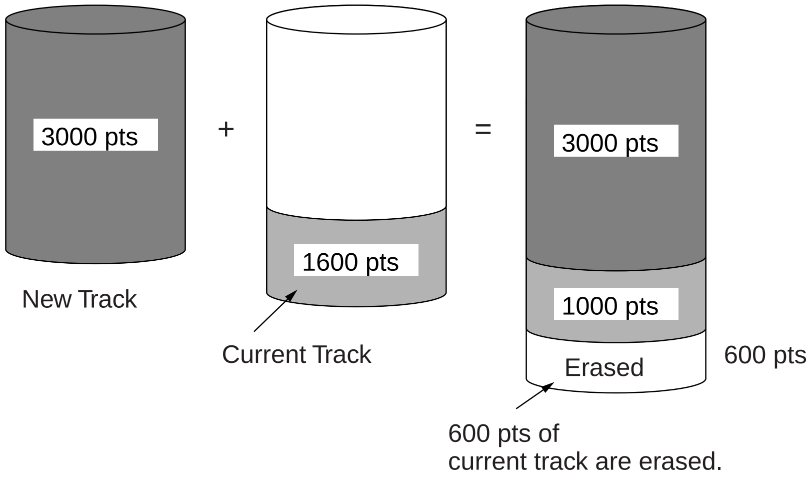


Figure 11-16 How track points are deleted

Mark/line memory

When the mark memory becomes full no marks can be entered.

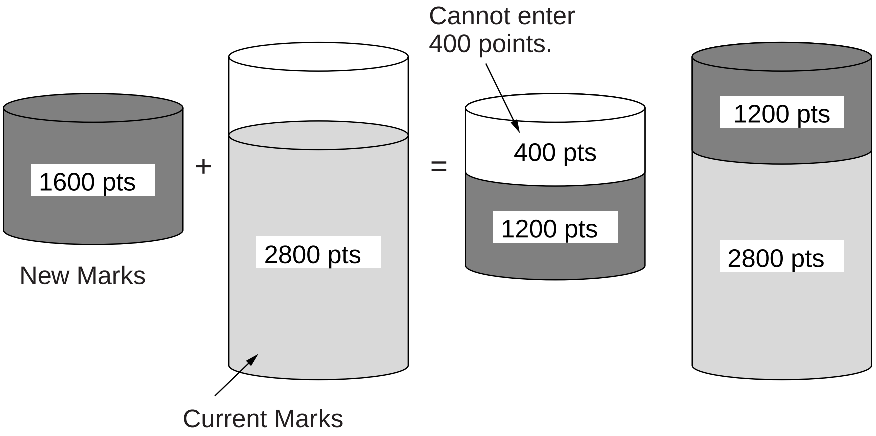


Figure 11-17 What happens when the mark memory becomes full and new marks are entered

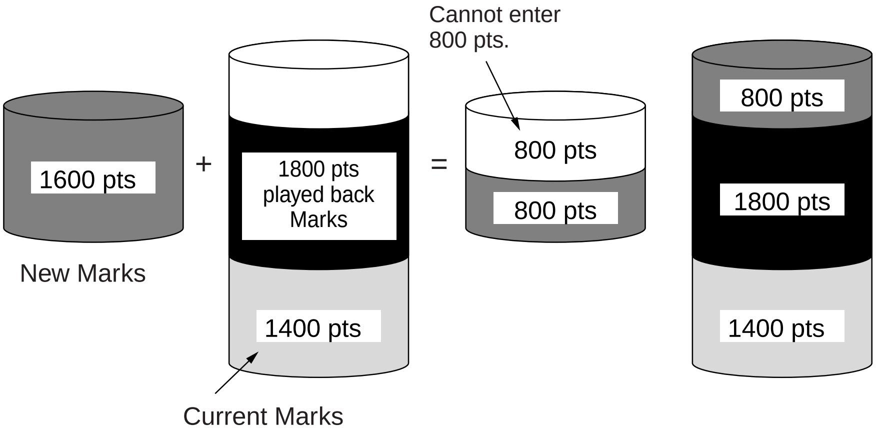


Figure 11-18 What happens when the mark memory is full and marks are added to existing and loaded marks

11.10 Apportioning the Memory

The default memory apportion is 4,000 points each of tracks and marks. However, you may change that setting to suit your operating needs.

If you want the memory apportion to be 5,000 points of track and 3,000 points of marks, for example, follow the procedure below.

Note: *All track and marks are erased when the memory is reapportioned.*

1. Press the [MENU] key.
2. Press the [7] key to select APPORTION/DELETE MEMORY.
3. Press the [1] key to select APPORTION MEMORY.

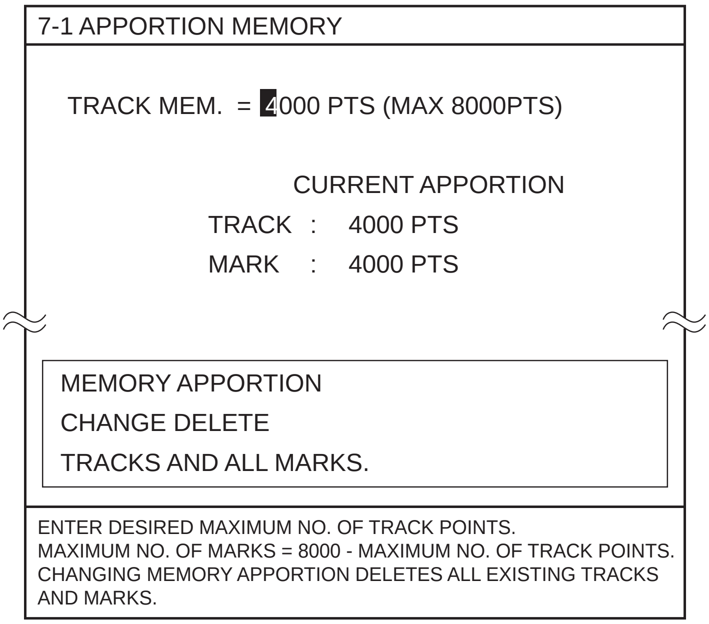


Figure 11-19 APPORTION MEMORY screen

4. Enter number of memory points desired for track. If you want the track capacity to be 5,000 points, press the [5] key and then press the [0] key three times.
5. Press [ENT], [+] and [ENT].

11.11 Reading Number of Track, Marks Used

1. Press the [MENU] key.
2. Press the [7] key to select APPORTION/DELETE MEMORY.
3. Press the [2] (DELETE TRACK) or [3] (DELETE MARK) key. The figure below shows the DELETE TRACK screen.

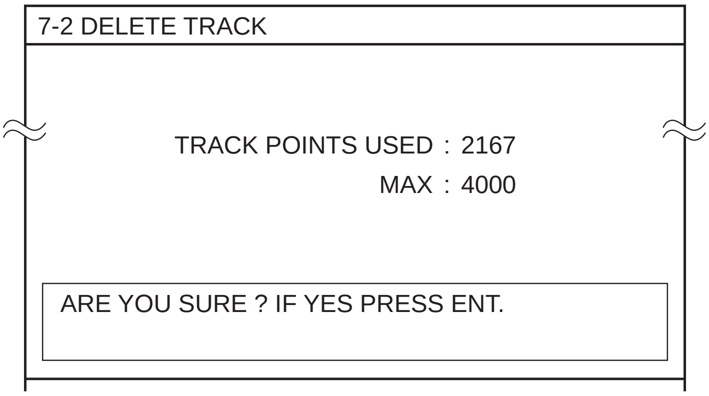


Figure 11-20 DELETE TRACK screen

The display shows number of points used/track memory capacity. In Figure 11-20, 2,167 points of track have been used out of 4,000.

4. Press the [PLOT] key to return to the plot display.

11.12 Smoothing

In Figure 11-21, the actual ship's track is shown by a wide hatched arrow and the position being fed from the navigational aid is shown by black dots. If smoothing is selected to "0 (off)," the track shown on the display will be a irregular track plotting (solid line) due to signal variations. To smooth this track, the "Weight Factor" given to new position data compared to previous fixes should be changed.

For instance, number 03 provides a weighting factor of 13/16 for new data and 3/16 for previous data. The higher the smoothing number, the slower the position updating becomes. In the figure below, the track shown by the broken line has a time delay more than the one shown by the dot-dash line, because of higher smoothing rate.

To enter a smoothing rate of 03, for example;

1. Press the [MENU] and [8].
2. Select L/L SMOOTHING.
3. Press the [0] and [3] keys to enter smoothing rate of 3.
4. Press the [ENT] key.

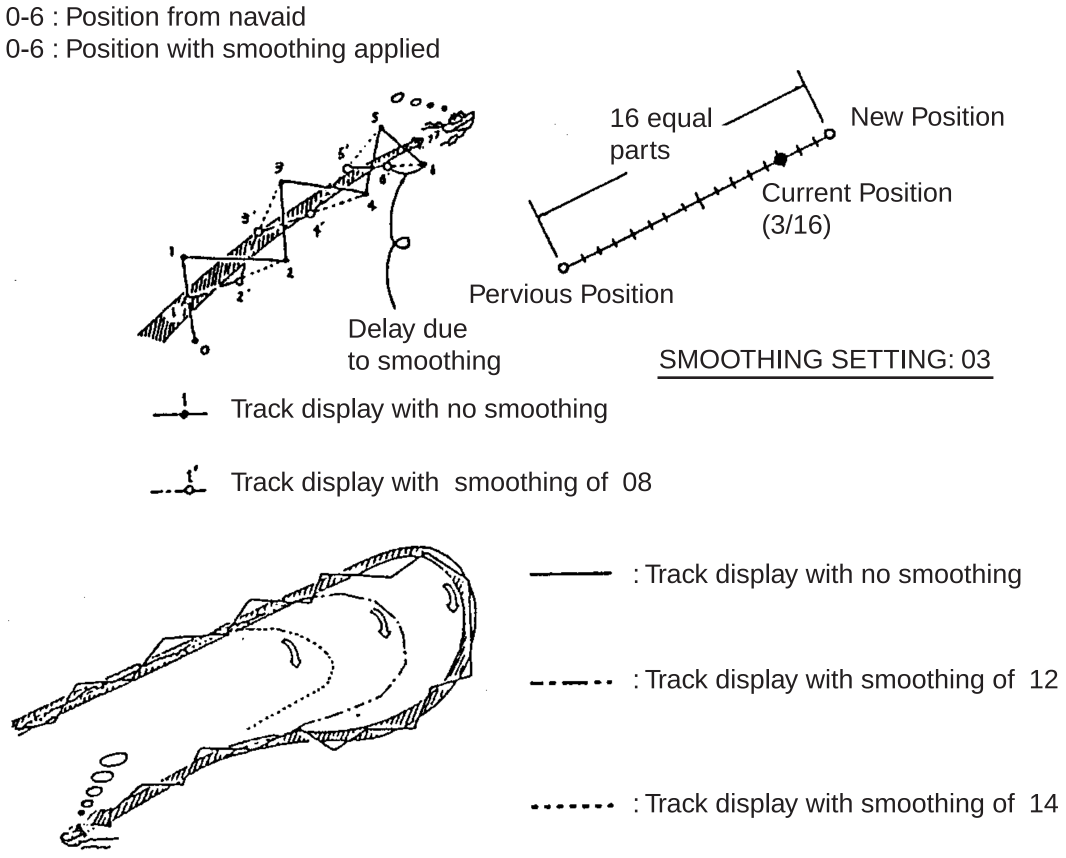


Figure 11-22 Smoothing

11.13 Selecting Navaid

Navigation data can be fed from the internal GPS receiver (GP-3300 only) or external navigator. The default navaid setting for the GP-3300 is the internal GPS receiver.

To select an external navaid;

1. Press [MENU] and [8] to display the INITIAL SETTING menu.

```
8 INITIAL SETTINGS
   PAGE CHANGE (TO GPS INITIAL SETTINGS)
   INTERNAL NAV        =   ON       [OFF]
 ▶ EXTERNAL NAV        =  [GPS]  LC  LA  DC  DR  OFF
   I/O DATA FORMAT     =  [CIF]  NMEA183  NMEA180/182
```

Figure 11-23 INITIAL SETTINGS menu, first three items

2. Select OFF from the INTERNAL NAV field.
3. Select the EXTERNAL NAV line.
4. Select navigator desired: LC, Loran C; LA, Loran A; DC, Decca; DR, Dead Reckoning.
5. Press the [ENT] key.

Note: If both internal and external GPS receivers are selected on the GP-3300, position data from the internal receiver will be used to fix position.

11.14 Track, Mark and Marker Attributes

The INITIAL SETTINGS menu (Menu 8) and SPECIAL menu (Menu 9-6) contain display-related items which you change the size or shape or turn on/off as desired.

The figure below shows the items on the INITIAL SETTINGS menu which you can change their attributes.

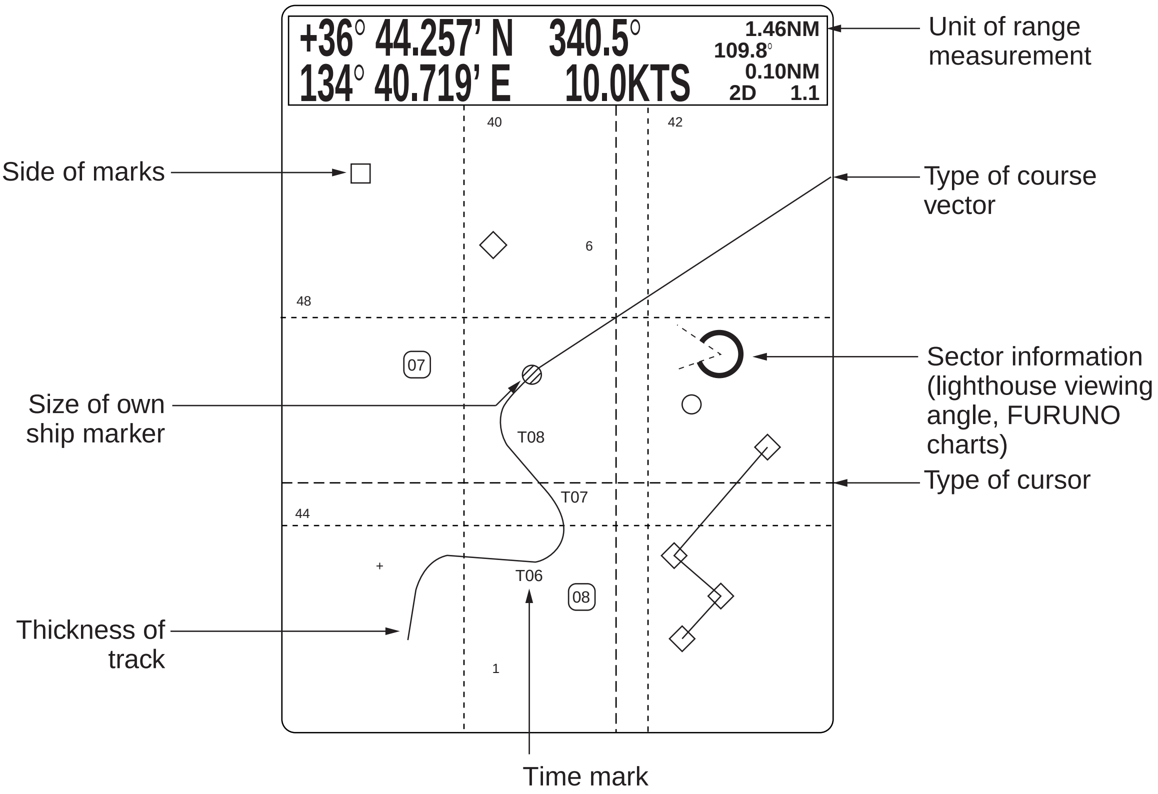


Figure 11-24 Items whose attributes you can change on the INITIAL SETTINGS and SPECIAL menus

Initial settings menu

8 INITIAL SETTINGS				
LINE (HOLD PLOT)	= ON	[OFF]		
MAGNETIC DEVIATION	= [AUTO] (07°W)	MAN (06°E)	(0~99)	
▶ BEARING	= TRUE	[MAGNETIC]		
COURSE VECTOR	= VECTOR	[LINE]	OFF	
MARK SIZE	= [LARGE]	SMALL		
CURSOR SIZE	= [LARGE]	SMALL		
OWN SHIP MARK	= LARGE	[SMALL]		
TRACK WIDTH	= THICK	[THIN]		
RANGE UNIT	= [NM]	Km	SM	
VTD AVG TIME	= 10MIN			
DATE	= 1998-04-10 (YYYY-MM-DD)			
TIME	= 10: 01: 50			
EXTERNAL CLOCK	= [ON]	OFF		
AUTOPILOT DISPLAY	= [ON]	OFF		
TD INDICATION	= LA	LC	[OFF]	

Figure 11-25 INITIAL SETTINGS menu

Special menu

The SPECIAL menu, which you can display by pressing [MENU], [9], [6] also contains display screen-related items which you can turn on or off.

9-6 SPECIAL		
▶ TIME MARK	= [ON]	OFF
EVENT MARK WINDOW	= [ON]	OFF
ROUTE LINE	= [ON]	OFF
SCREEN SCALE	= [DISTANCE]	SCALE
AD DATA FORMAT	= [NMEA-183]	NMEA-180S
SECTOR INFORMATION	= ON	[OFF]

Figure 11-26 SPECIAL menu

The tables on the next page explain the display screen-related items on the INITIAL SETTINGS and SPECIAL menus.

Table 11-1 Customizable items on the INITIAL SETTINGS menu

Item	Function
WAYPOINT MARK	Globally turns the waypoint mark display on/off.
EVENT MARK	Globally turns event mark display on/off.
COURSE VECTOR	Selects course vector display method; vector, line or none (off).
MARK SIZE	Selects mark size for large/small.
CURSOR SIZE	Select cursor size for large/small.
OWN SHIP MARK	Selects own ship mark for large/small.
TRACK WIDTH	Selects track width for thick/thin.
RANGE UNIT	Displays range in either nautical miles, kilometers, or statute miles.
VTD AVG TIME	Changes averaging time for ship’s speed used in ETA calculation.
EXTERNAL CLOCK	External navigator's clock resets the 3300's internal clock every hour.

Table 11-2 Customizable items on SPECIAL menu

Item	Function
TIME MARK	Turns the time mark on/off.
EVENT MARK WINDOW	Turns mark data window on/off on video pilot display.
ROUTE LINE	Disconnects/connects waypoints on a route.
SCREEN SCALE	Selects display screen scale for distance or scale.
AP DATA FORMAT	Selects autopilot data format; NMEA 0183 or NMEA 0180S.
SECTOR INFORMATION	Turns lighthouse viewing angle indication on FURUNO charts on/off. Viewing angle is shown as an arc extending from lighthouse position. Arc color, white or green, is the color of the light beam. This feature is available on selected charts.

11.15 Chart Symbols, Contour Lines Attributes

You can change the color of chart symbols (wreck, beacon, etc.) and style and color of contour lines as follows:

1. Press [MENU], [9] and [7] to display the SELECT MARKS/ CONTOUR LINES menu.

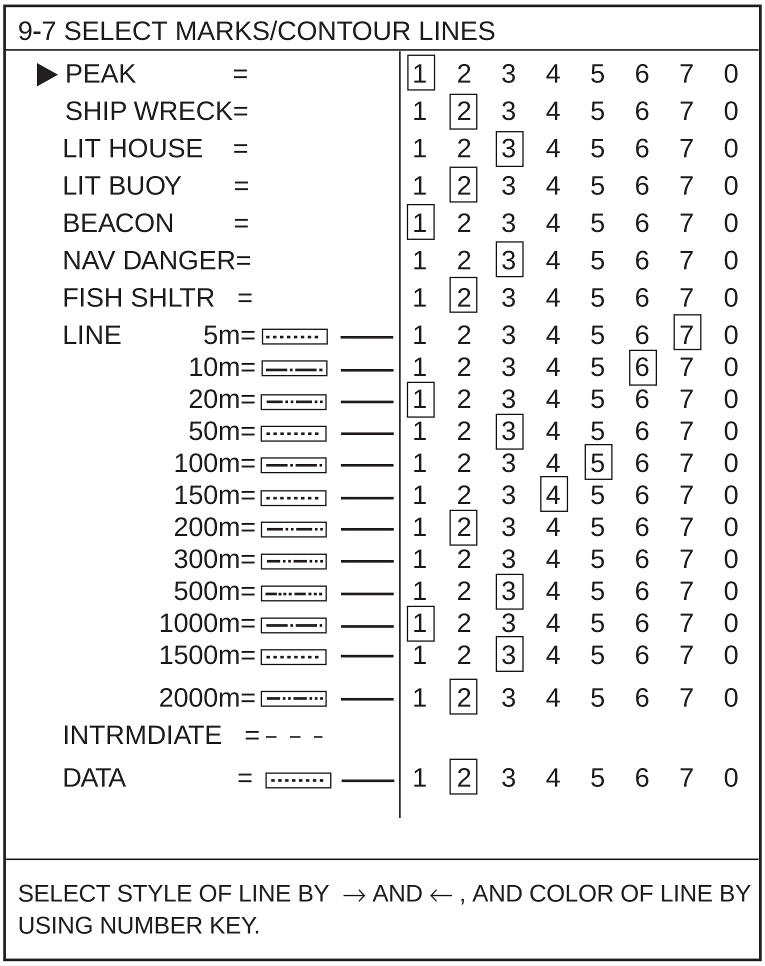


Figure 11-27 SELECT MARKS/CONTOUR LINES menu

2. Select item and option as appropriate.

3. Press the [ENT] key.

MAINTENANCE & TROUBLESHOOTING

Regular maintenance is important for good performance. Following the procedures set forth in this chapter will help keep your unit in top operating condition for many years to come.

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel should work inside the equipment.

12.1 Preventive Maintenance

This section contains maintenance and checking information for both the user . A regular maintenance schedule should be established and should include at least the following.

- Checks connectors and terminals on rear of unit for proper seating and rust. Clean if necessary.
- Check earth terminal for rust. Clean if necessary.
- Dust on the display dims the picture. Clean the display screen regularly with a soft cloth. The only recommended cleaning agent is an anti-static spray. Use special care when cleaning the LCD, since it scratches easily.

12.2 Diagnostic Tests

The display unit incorporates several diagnostic tests which check the system for proper operation.

Self test at power on

Each time you turn on the power all devices and the internal battery are checked for proper operation. The display shows the results of the check as OK (normal) or NG (No Good). In the sample results shown in Figure 12-1, all devices and the internal battery are operating normally.

```
START UP TEST

ROM                 =  OK
SRAM                =  OK
VRAM                =  OK
INTERNAL BATTERY    =  OK
```

Figure 12-1 Sample start up test results

If NG is shown for the internal battery, press any key, save display to a memory card, and then turn off the power. Request replacement of the internal battery.

Memory circuits, I/O ports

This test continuously checks the memory circuits and I/O ports. Further, it can check ROM and RAM cards for proper operation, by inserting them before executing the test. (If no card(s) is inserted, NG appears as the results for the card check.)

1. Press the [MENU] key.
2. Press the [9] key to select MISC.
3. Press the [9] key to display the SELF TEST menu.

```
9-9 SELF TEST
 1 MEMORY • I/O PORT
 2 KEYBOARD
 3 TEST PATTERN 1
 4 TEST PATTERN 2
```

Figure 12-2 SELF TEST menu

4. Press the [1] key to select MEMORY•I/O PORT. Then, the unit checks each memory circuit and I/O port one by one, displaying the results after each checking each item.

Asterisk marks item currently being tested. →

9-9-1 MEMORY TEST

*ROM		=	OK
SRAM		=	OK
VRAM		=	OK
MEMORY CARD	UPPER LOWER	=	OK OK *1
INTERNAL BATTERY		=	OK
CARD BATTERY	UPPER LOWER	=	OK OK
SIO (DATA IN/OUT)		=	*2
SIO (AUTOPILOT)		=	*2
GPS		=	OK

PRESS ANY KEY TO EXIT.

1* "NG" displayed when chart card is inserted.

*2 Special test connectors required to check "SIO."

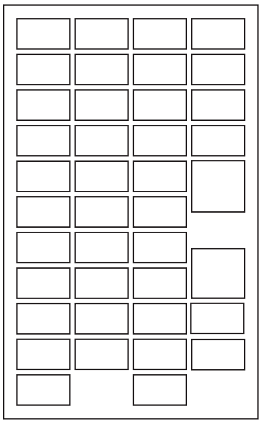
Figure 12-3 Sample memory circuit, I/O port test results display

5. To escape from the test, press any key.

Keyboard test

1. Press [MENU], [9], [9] and [2] to select KEYBOARD TEST. The display should look like Figure 12-4.

9-9-2 KEYBOARD TEST



PRESS KEYS ONE BY ONE TO TEST.

PRESS CLR 3 TIMES TO RETURN TO MAIN MENU.

Figure 12-4 Keyboard test display

2. Press each key one by one. If a key is functioning normally its location on the display lights in light-blue while the key is pressed and held.

3. After pressing all keys, press the [CLR] key three times to escape.

Test pattern 1 (color dropout)

This test checks for color dropout.

1. Press [MENU], [9], [9] and [3] to select TEST PATTERN 1. The display should look like Figure 12-5.

Figure 12-5 Test pattern 1

2. Check the pattern for color dropout.

3. Press any key to escape.

Test pattern 2 (color distortion)

This test checks for color distortion.

1. Press [MENU], [9], [9] and [4] to select TEST PATTERN 2.

2. Press keys 1-8 one by one to check for proper display of colors.

3. Press any key except numeric keys 1-8 to escape.

12.3 Error Messages

The following is an alphabetical listing of error messages which may appear on the display along with an explanation of what they mean and what to do when they appear.

Cannot be deleted together.

Cannot delete both current track and loaded track together by the cursor. Use the BOX method.

Cannot load waypoint/route when destination is selected.

Destination waypoint is selected.

Cannot write over entered waypoint no.

Waypoint 99 entered on route list. This number is reserved for external waypoint.

Card is full.

Not enough memory space on card to save file. Use new memory card.

Card is write protected. Try again?

Memory card write protected. Release write protection tab on card.

Card not formatted.

Memory card not formatted. Format memory card.

Correction value is too large.

Correction value entered is greater than 60 minutes.

Could not delete. Press any key.

Memory card write protected.

Could not load.

Memory card contents may be corrupted.

Could not load. Press any key to exit.

Memory card ejected before it could be loaded.

Could not save. Press any key.

Memory card write protected, or ROM card inserted instead of memory card.

Could not save. Try again?

- Memory card write protected.
- ROM card inserted instead of memory card.
- Memory card is full.

Data error.

- No data entered in waypoint selected.
- No data entered in route selected.
- **ENT** key pressed before entering data.

Formatting failed. Press any key to exit.

- Memory card is write protected.
- ROM card inserted instead of memory card.

Insert memory card.

Load area too small.

Not enough memory space remaining on the display to load file desired.

Memory card not inserted. Insert memory card and press ENT.

- Memory card not inserted properly.
- Memory card inserted in wrong slot.

Memory card replaced.

Memory card replaced during operation.

No file.

No file by that name exists.

No files on card. Insert proper memory card and press ENT.

No files on memory card to delete.

No ship's position input.

No navigation data input. Check navigator (external navigator used) and check navigation selection on the INITIAL SETTINGS menu.

Too many files. Press any key to exit.

Too many files to save information to memory card. Delete a file (menu 37), or use new memory card.

Waypoint already used.

Waypoint being used as destination waypoint.

Waypoint area is full.

No free waypoint area when waypoint registered without entering waypoint number.

Waypoint number already exists.

L/L position of waypoint entered as route point matches L/L position of a registered waypoint.

12.4 Replacement of Fuse

The 5A fuse on the rear of the unit protects the equipment from equipment fault and overcurrent. When you cannot turn on the power, check the fuse on the rear of the unit. If the fuse has blown, check the cause before replacing it.

⚠ CAUTION
Use the proper fuse. Use of a wrong fuse can cause fire or equipment damage.

12.5 Replacement of Batteries

Both the GDC Board inside the display unit and the memory cards use a battery to store information. The life of these batteries is about three years. When the voltage of a battery is low, the “battery” icon appears on the display. The offending battery should be replaced at your earliest convenience, so that important information will not be lost.

Table 12-1 Replacement battery types and code numbers

Battery	Type	FURUNO Code No.
Memory Card Battery	Lithium Battery, CR2025	000-141-093
Battery on GDC Board	Lithium Battery, BR-213AE 2P	000-123-713

Memory card battery

Insert new battery within 10 minutes after removing expired battery. Otherwise, the information stored on the card will be lost.

1. Slide tab on card leftward. Remove battery.
2. Insert new battery plus terminal facing upward.
3. Close battery lid.

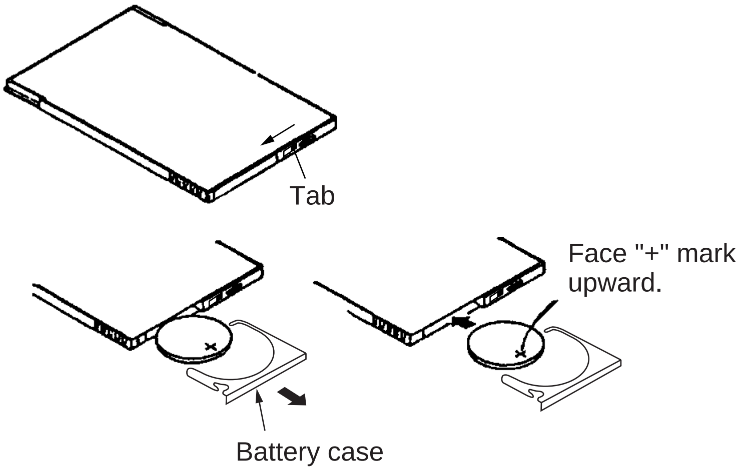


Figure 12-6 How to replace memory card battery

12.6 Verifying Program Version No.

The procedure which follows shows how to verify the program version no. of both the plotter section and the GPS section (GP-3300).

Plotter section

1. Press the [MENU] key.
2. Press the [8] key select INITIAL SETTINGS.

   The plotter program number and its version number appear at the bottom of the display. The extreme right two digits are the version number.

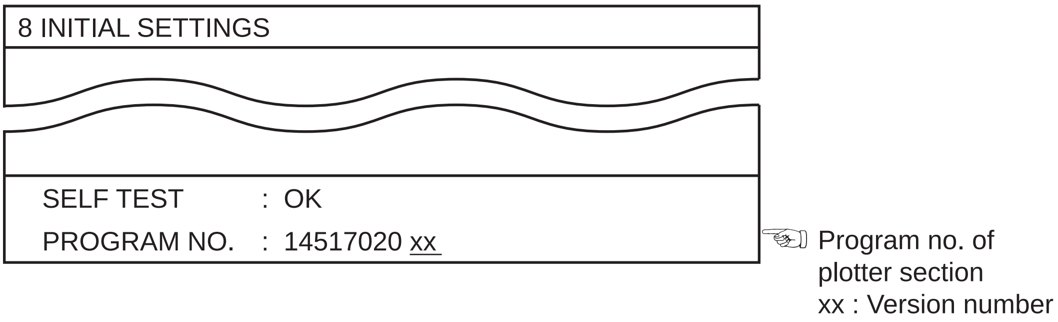


Figure 12-7 INITIAL SETTINGS menu, showing location of plotter secttion program number

GPS section (GP-3300)

3. Press [↑] to select PAGE CHANGE (TO GPS INITIAL SETTINGS).

   The GPS section program number and its version number appear at the bottom of the display. The extreme right two digits are the version number.

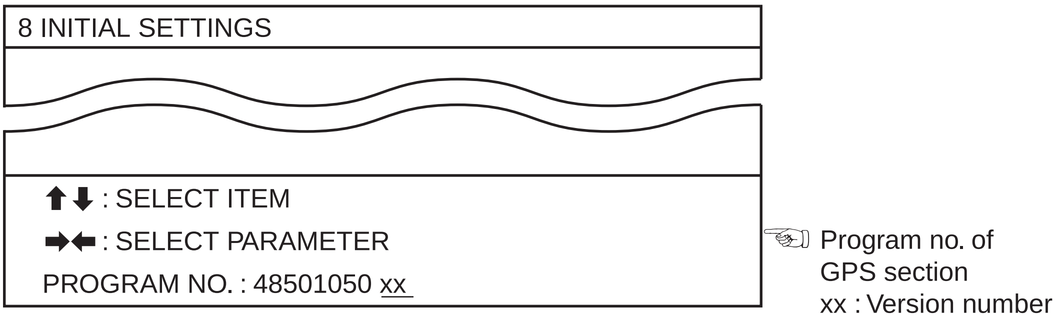


Figure 12-8 GPS INITIAL SETTINGS menu, showing location of GPS section program number

12.7 Troubleshooting Table

The section provides a troubleshooting table which the user can follow to identify and resolve operating problems. In most cases the cause of operating problems is simple; wrong key pressed, loosened connection, etc.

Table 12-2 Troubleshooting table

If...	Then...
Plotter Section (GD-3300/GP-3300)	
you cannot turn on the power	• check for blown fuse. • have a service technician measure voltage at power connector to confirm if it is within specified rating. • the power cable may be too thin; you may not be able to turn on the power because of large power loss (12 V set).
when turning on the power the self test results are not cleared after several seconds	• check for NG display. • press any key to try to restore normal operation. If that doesn't work, call for service.
nothing appears on the display	• try to adjust screen brilliance. • the unit may be operating in the economy mode. Press any key to cancel the economy mode.
own ship marker blinks fastly	• there is no navigation input. Check navigation device (external) and navigation aid selection on MENU 8.
asterisks appear instead of ship's position	• the navigation device (external) may be off. • check for loosened connection on navigator (external). • check navigation aid selection for error.
old track is erased	• the track memory is full. Save track to a memory card and then delete it from the display (MENU 72), or delete unnecessary track.
you erased old track but old track is still being erased	• you erased a mid section of the track.

(Continued on next page)

If...	Then...
Plotter Section (GD-3300/GP-3300)	
track is not displayed	• the menu item TRACK (HOLD PLOT) on the INITIAL SETTINGS menu is set for OFF. (no track display during no recording of track)
you cannot enter marks or lines	• the mark memory is full. Press [MENU], [7] and [3] to check number of mark points used.
you cannot erase a mark	• two or more marks mey share the same position. Press [CLR] several times to delete.
you cannot erase the flag mark on a route	• the point is currently selected as a destination waypoint. • it is part of a registered route.
you have selected a route for navigation but route waypoints are not connected	• a route waypoint which is within the arrival alarm range is selected. • ROUTE LINE on SPECIAL menu (MENU 96) is set for OFF.
estimated time of arrival is wrong	• clock setting is wrong. Press [MENU] and [8] to set clock.
bearing display is different from that output by another navigation aid	• bearing display method is not the same on each unit. • magnetic variation is applied to external navigator. Press [MENU] and [8] and then change bearing mode or apply magnetic variation correction.
asterisks are displayed instead of Loran TDs	• wrong Loran TD setting on MENU 8. Display that menu and reenter TDs.
Loran TDs wrong	• enter a TD offset value on MENU 8.
speed change reaction is too slow (for example, ship is dead in water but display shows ship's speed)	• check for unsuitable smoothing settting. Enter suitable smoothing figure on MENU 8.
a key is pressed but there is no response	• the keyboard may have locked. Do the following: 1) Reset the power. 2) If normal operation could not be restored, press [MENU], [9], [8] and [2] to clear all memories. If neither remedy works, call for service.

(Continued on next page)

IF...	THEN...
Plotter Section (GD-3300/GP-3300)	
you cannot save display to a memory card	• the card has not been formatted. • the card is write protected. • the card is full.
GPS Section (GP-3300)	
GPS accuracy is poor	• check for wrong antenna height setting on the GPS INITIAL SETTINGS menu.
GPS position-fixing time is short	• HDOP threshold and maximum elevation angle settings on GPS INITIAL SETTINGS menu may be wrong. The default settings of 20 (HDOP) and 5∞ (elevation angle) work well in most all cases.
position-fixing time much shorter than that of other vessels	• HDOP setting (GPS INITIAL SETTINGS menu) is too small.
there is no position fixing	• the Almanac is more than one year old. • check for wrong date and time on INITIAL SETTINGS menu. • check antenna.

12.8 Clearing Memories

Both the GD-3300 and GP-3300 have GD and display screen memories. The GP-3300 also has the GP memory.

Memories can be cleared to start fresh operation. When you clear a memory the equipment automatically restores default settings for the memory cleared.

1. Press the [MENU] key.

MENU
1 WAYPOINT 2 ROUTE 3 SAVE DATA TO MEMORY CARD 4 LOAD MEMORY CARD 5 DISPLAY MEMORY CARD 6 CORRECT POSITION 7 APPORTION/DELETE MEMORY 8 INITIAL SETTINGS 9 MISC
SELECT BY USING NUMBER KEY.

Figure 12-9 Main menu

2. Press the [9] key to select MISC.

9 MISC
1 EDIT TRACK/MARK
2 CALCULATE RANGE/BEARING
3
4
5
6 SPECIAL
7 SELECT MARKS/CONTOUR LINES
8 CLEAR MEMORY
9 SELF TEST
SELECT NUMBER.

Figure 12-10 MISC menu

3. Press the [8] key to select CLEAR MEMORY.

9 - 8 CLEAR MEMORY
1 CLEAR SCREEN DATA
2 CLEAR ALL GD DATA
3 CLEAR GPS DATA
4 CLEAR ALL DATA

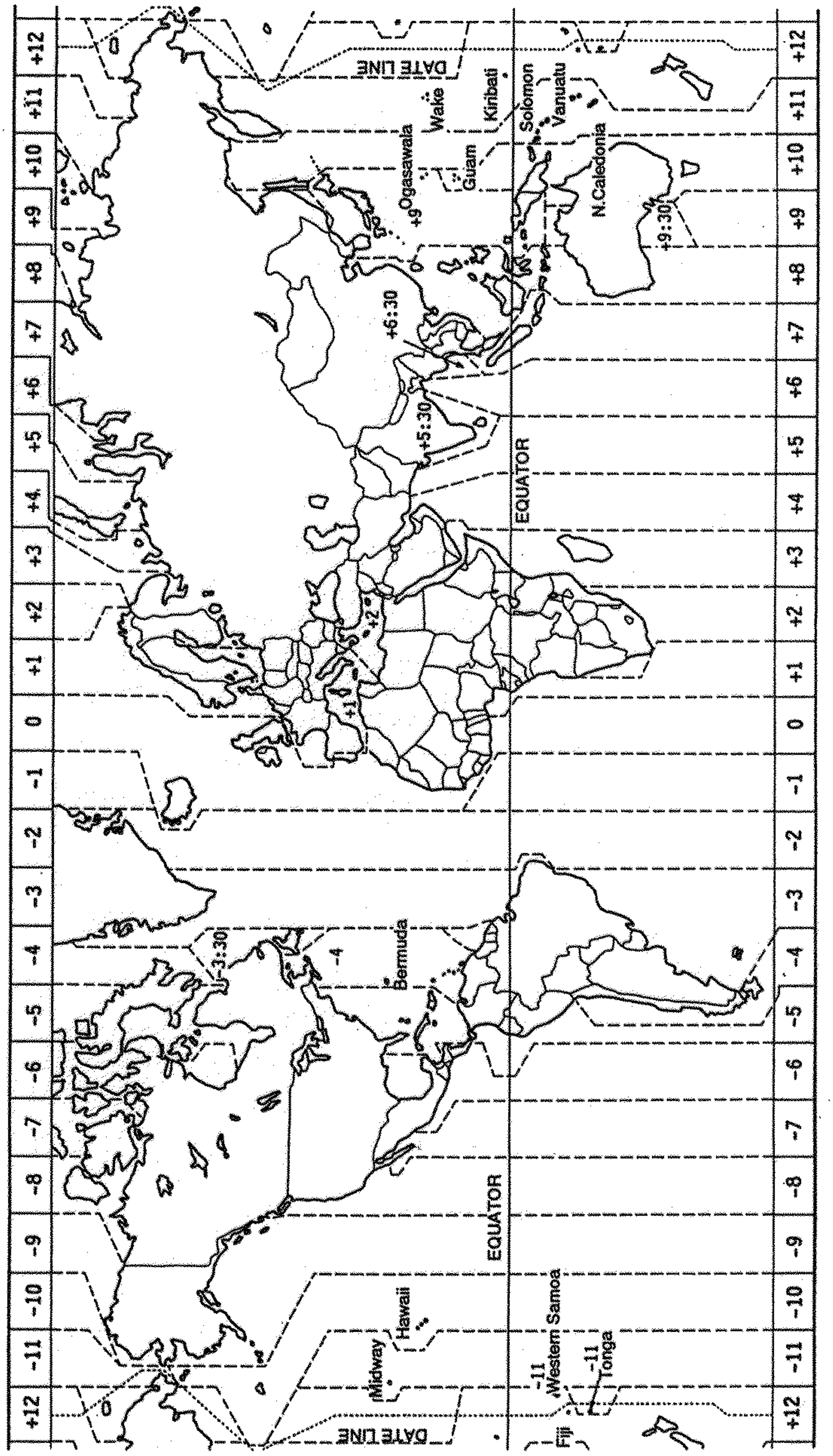
Figure 12-11 CLEAR MEMORY menu

4. Press appropriate numeric key to clear memory:

   [1] CLEAR SCREEN DATA: Clears all data currently shown on the screen.
   [2] CLEAR ALL GD DATA: Clears all GD data (track, marks, lines, waypoints, routes).
   [3] CLEAR GPS DATA: Clears all GPS data (GPS-related menu settings).
   [4] CLEAR ALL DATA: Clears all screen, GD and GPS data.

5. Press the [ENT] key.

Time Differences



Geodetic Chart List

001:	WGS84	
002:	WGS72	
003:	TOKYO	: Mean Value (Japan, Korea & Okinawa)
004:	NORTH AMERICAN 1927	: Mean Value (CONUS)
005:	EUROPEAN 1950	: Mean Value
006:	AUSTRALIAN GEODETIC 1984	: Australia & Tasmania
007:	ADINDAN	: Mean Value (Ethiopia & Sudan)
008:		: Ethiopia
009:		: Mali
010:		: Senegal
011		: Sudan
012:	AFG	: Somalia
013:	AIN EL ABD 1970	: Bahrain Is.
014:	ANNA 1 ASTRO 1965	: Cocos Is.
015:	ARC 1950	: Mean Value
016:		: Botswana
017:		: Lesotho
018:		: Malawi
019:		: Swaziland
020:		: Zaire
021:		: Zambia
022:		: Zimbabwe
023:	ARC 1960	: Mean Value (Kenya & Tanzania)
024:		: Kenya
025:		: Tanzania
026:	ASCENSION IS. 1958	: Ascension Is.
027:	ASTRO BEACON “E”	: Iwo Jima Is.
028:	ASTRO B4 SOR. ATOLL	: Tern Is.
029:	ASTRO POS 71/4	: St. Helena Is.
030:	ASTRONOMIC STATION 1952	: Marcus Is.
031:	AUSTRALIAN GEODETIC 1966	: Australia & Tasmania
032:	BELLEVUE (IGN)	: Efate & Erromango Islands
033:	BERMUDA 1957	: Bermuda Islands
034:	BOGOTA OBSERVATORY	: Columbia
035:	GAUPO INCHAUSPE	: Argentina
036:	CANTON IS. 1966	: Phoenix Islands
037:	CAPE	: South Africa
038:	CAPE CANAVERAL	: Mean Value (Florida & Bahama Islands)
039:	CARTHAGE	: Tunisia
040:	CHATHAM 1971	: Chatham Is. (New Zealand)
041:	CHUA ASTRO	: Paraguay
042:	CORREGO ALEGRE	: Brazil
043:	DJAKARTA (BATAVIA)	: Sumatra Is. (Indonesia)
044:	DOS 1968	: Gizo Is. (New Georgia Is.)
045:	EASTER IS. 1967	: Easter Is.
046:	EUROPEAN 1950 (Cont’d)	: Western Europe
047:		: Cyprus
048:		: Egypt
049:		: England, Scotland, Channel & Shetland Islands
050:		: England, Ireland, Scotland, & Shetland Islands
051:		: Greece
052		: Iran
053:		: Italy, Sardinia
054:		: Italy, Sicily
055:		: Norway & Finland
056:		: Portugal & Spain
057:	EUROPEAN 1979	: Mean Value
058:	GANDAJIKA BASE	: Republic of Maldives
059:	GEODETIC DATUM 1949	: New Zealand
060:	GUAM 1963	: Guam Is.
061:	GUX 1 ASTRO	: Guadalcanal Is.
062:	HJORSEY 1955	: Iceland
063:	HONG KONG 1363	: Hong Kong
064:	INDIAN	: Thailand & Vietnam
065:		: Bangladesh, India & Nepal
066:	IRELAND 1965	: Ireland
067:	ISTS 073 ASTRO 1969	: Diego Garcia
068:	JOHNSTON IS. 1961	: Johnston Is.
069:	KANDAWALA	: Sri Lanka
070:	KERGUELEN IS.	: Kerguelen Is.
071:	KERTAU 1948	: West Malaysia & Singapore
072:	LA REUNION	: Mascarene Is.
073:	L. C. 5 ASTRO	: Cayman Brac Is.
074:	LIBERIA 1964	: Liberia
075:	LUZON	: Philippines (excl. Mindanao Is.)
076:		: Mindanao Is.
077:	MAHE 1971	: Mahe Is.
078:	MARCO ASTRO	: Salvage Islands
079:	MASSAWA	: Eritrea (Ethiopia)
080:	MERCHICH	: Morocco
081:	MIDWAY ASTRO 1961	: Midway Is.
082:	MINNA	: Nigeria
083:	NAHRWAN	: Masirah Is. (0man)
084:		: United Arab Emirates
085:		: Saudi Arabia
086:	NAMIBIA	: Namibia
087:	MAPARIMA, BWI	: Trinidad & Tobago
088:	NORTH AMERICAN 1927	: Western United States
089:		: Eastern United States
090:		: Alaska
091:		: Bahamas (excl. San Salvador Is.)
092:		: Bahamas, San Salvador Is.
093:		: Canada (incl. Newfoundland Is.)
094:		: Alberta & British Columbia
095:		: East Canada
096:		: Manitoba & Ontario
097:		: Northwest Territories & Saskatchewan
098:		: Yukon
099:		: Canal Zone
100:		: Caribbean
101:		: Central America
102:		: Cuba
103:		: Greenland
104:		: Mexico
105:	NORTH AMERICAN 1983	: Alaska
106:		: Canada
107:		: CONUS
108:		: Mexico, Central America
109:	OBSERVATORIO 1966	: Corvo & Flores Islands (Azores)
110:	OLD EGYPTIAN 1930	: Egypt
111:	OLD HAWAIIAN	: Mean Value
112:		: Hawaii
113:		: Kauai
114:		: Maui
115:		: Oahu
116:	OMAN	: Oman
117:	ORDNANCE SURVEY OF GREAT BRITAIN 1936	: Mean Value
118:		: England
119:		: England, Isle of Man & Wales
120:		: Scotland, & Shetland Islands
121:		: Wales
122:	PICO DE LAS NIVIES	: Canary Islands
123:	PITCAIRN ASTRO 1967	: Pitcairn Is.
124:	PROVISIONS SOUTH CHILEAN 1963	: South Chile (near 53˚ S)
125:	PROVISIONAL SOUTH AMERICAN 1956	: Mean Value
126:		: Bolivia
127:		: Chile-Northern Chile (near 19˚S)
128:		: Chile-Southern Chile (near 43˚S)
129:		: Columbia
130:		: Ecuador
131:		: Guyana
132:		: Peru
133:		: Venezuela
134:	PUERTO RICO	: Puerto Rico & Virgin Islands
135:	QATAR NATIONAL	: Qatar
136:	QORNOQ	: South Greenland
137:	ROME 1940	: Sardinia Islands
138:	SANTA BRAZ	: Sao Maguel, Santa Maria Islands (Azores)
139:	SANTO (DOS)	: Espirito Santo Is.
140:	SAPPER HILL 1943	: East Falkland Is.
141:	SOUTH AMERICAN 1969	: Mean Value
142:		: Argentina
143:		: Bolivia
144:		: Brazil
145:		: Chile
146:		: Columbia
147:		: Ecuador
148:		: Guyana
149:		: Paraguay
150:		: Peru
151:		: Trinidad & Tobago
152:		: Venezuela
153:	SOUTH ASIA	: Singapore
154:	SOUTHEAST BASE	: Porto Santo & Madeira Islands
155:	SOUTHWEST BASE	: Faial, Graciosa, Pico, Sao Jorge, & Terceira Is.
156:	TIMBALAI 1948	: Brunei & East Malaysia (Sarawak & Sadah)
157:	TOKYO	: Japan
158:		: Korea
159:		: Okinawa
160:	TRISTAN ASTRO 1968	: Tristan da Cunha
161:	VITI LEVU 1916	: Viti Levu Is. (Fiji Islands)
162:	WAKE-ENIWETOK 1960	: Marshall Islands
163:	ZANDERIJ	: Surinam
164:	BUKIT RIMPAH	: Bangka & Belitung Islands (Indonesia)
165:	CAMP AREA ASTRO	: Camp Mcmurdo Area, Antarctica
166:	G. SEGARA	: Kalimantan Is. (Indonesia)
167:	HERAT NORTH	: Afghanistan
168:	HU-TZU-SHAN	: Taiwan
169:	TANANARIVE OBSERVATORY 1925	: Madagascar
170:	YACARE	: Uruguay
171:	RT-90	: Sweden

SPECIFICATIONS OF COLOR VIDEO PLOTTER/COLOR GPS PLOTTER GD/GP-3300

1. GENERAL

(1)	Display	10.4 inch high resolution color LCD, 8 colors
(2)	Projection	Mercator
(3)	Usable Area	85° latitude or below
(4)	Display Mode	Plotter, Video pilot, NAV data

2. GPS RECEIVER (GP-3300 ONLY)

(1)	Receiving Channels	8 channels, 8 satellite tracking, Parallel tracking
(2)	Rx Frequency	1575.42 MHz
(3)	Rx Code	C/A code
(4)	Position Fixing System	All in view, 8-state Kalman filter
(5)	Position Accuracy	Approx. 50 m, 95% of the time, horizontal dilution of position (HDOP)≤4 Note: All GPS receiver are subject to degradation of position and velocity accuracy under the U.S. Department of Defense. Position may be degraded. DGPS: 5 m approx., 95% of the time
(6)	Tracking Velocity	900 kts
(7)	Position-fixing Time	Warm start: 20 seconds, Cold start: 2 minutes

3. DISPLAY SECTION

(1)	Effective area	211.2×158.4 mm
(2)	Display pixels	640×480 dots
(3)	Position Indication	Latitude/longitude or Loran C or A LOPS

4. PLOTTER

(1)	Effective Projection Area	0.14 nm to 6,144 nm (at equatorial area)
(2)	Track Display	Plot interval: by time (0 to 60 min.) or by distance (0 to 9.99 nm)
(3)	Colors	Red, yellow, green , purple, light-blue, blue, white
(4)	Memory Capacity	8000 points (track and mark point)
(5)	Storage Capacity	Waypoint : 98 pts. with comment (10 character) Simple route: 10 routes with 15 waypoints each
(6)	External Waypoint	1 point
(7)	Alarms	Arrival and Anchor watch alarms Cross track error and border alarms

	Ship's speed in and out alarms
(8) Electronic Chart	FURUNO chart card or NAVIONICS chart card available
(9) Information Display	Ship's L/L position (Loran C or A TDs also available)
	Date and Time, Ship's speed, Chart scale, Waypoint L/L position,
	Range and bearing to destination waypoint
	Cursor intersection L/L position
	Range and bearing to cursor intersection
	Water temperature and water depth (sensor data required)

5. DATA INPUT / OUTPUT

(1) Number of ports	Input: 3 Ports, Output: 4 ports
(2) Input data	DGPS: RTCM SC104
	DATA IN/OUT: NMEA0183, NMEA0180/0182 and CIF
	AP IN/OUT: NMEA0183
(3) Output data	DGPS: NMEA0183, NMEA0180/0182 and CIF
	DATA IN/OUT: NMEA0183, NMEA0180/0182 and CIF
	DATA OUT: NMEA0183, NMEA0180/0182 and CIF
	AP IN/OUT: NMEA0183 and NMEA0180S

6. POWER SOURCE

(1) GD-3300:	12-24 VDC(-10%,+30%); 1.1-0.6 A
(2) GP-3300:	12-24 VDC(-10%,+30%); 1.3-0.7 A
(3) For AC Source	100/110/115/200/220/230 VAC, 1 phase, 50/60 Hz
	(optional rectifier required)

7. ENVIRONMENTAL CONDITIONS

(1) Useable Temperature	Antenna unit: -25°C to + 70°C
	Display unit: -15°C to +55°C
(2) Relative Humidity	95%(40°C)
(3) Waterproofing	Antenna unit (GP-3300 only): IEC60529 IPX6
	Display unit: IEC60529 IPX2

8. COATING COLOR

(1) Display Unit	Cover: Munsell 2.5GY5/1.5
	Panel: N3.0

INDEX

A

ALARM key 6-5
Alarms
- anchor watch alarm 6-2
- arrival alarm 6-1
- border alarm 6-3
- ship's speed alarm 6-4
- silencing buzzer 6-5
- XTE alarm 6-3

Anchor watch alarm 6-2
Arrival alarm 6-1
Autopilot data 8-1–8-5

B

Battery replacement 12-8
Bearing reference 11-3
Border alarm 6-3
BRILL ECONO key 1-7, 1-17

C

CENTER key 1-5
Chart cards
- care and handling 1-9
- inserting 1-2

Chart icons 1-10
Charts
- background color, brightness 11-4
- buoy, lighthouse (NAVIONICS cards) 1-11
- chart appearance 11-4
- chart scale 1-7
- chart scale format 11-18
- contour line color 11-19
- correcting position 11-5–11-7
- grid 11-4
- land color 11-4
- land density 11-4
- lighthouse sector data 11-19
- place-name indication 11-4
- symbol color 11-19
- symbols (FURUNO cards) 1-10
- troubleshooting 1-9

CLR key 6-5
Cold start (GPS receiver) 10-8
Color distortion test 12-4
Color dropout test 12-4
Contour line color 11-19
Control description 1-2
Course vector 11-18
Cursor
- description 1-4
- size 11-18

CURSOR ON/OFF key 1-4

D

Data window 1-12
Date setting 1-20
Diagnostic tests
- color distortion 12-4
- color dropout 12-4
- keyboard 12-3
- memory, I/O port test 12-2

Display mode 1-13
Display shifting 1-5

E

Economy mode 1-17
Error messages 12-5
Event mark
- data window on/off 11-18
- turning off all 11-18

External event mark
- erasing 3-5
- turning on/off 3-5

F

Fuse replacement 12-7

G

Geodetic chart list A-2
Geodetic datum 10-9
GPS receiver
- cold start 10-8
- geodetic datum 10-9
- GPS data on navigation data display 10-1–10-3
- GPS/DGPS initial settings 10-3
- position correction 10-9
- satellite selection/deselection 10-5
- smoothing 10-6–10-7

GPS smoothing 10-6–10-7

H

HOLD indication 2-1

I

Icons
- chart 1-10
- operational status 1-17

INTVL PLOT key 2-9

K

Keyboard test 12-3

L

Lines
  changing color 3-6
  deleting all 3-6
  deleting individual points on a line 3-6
  entering 3-6
Loran TDs
  correcting position 11-7
  Loran A TDs display 11-1
  Loran C TDs display 11-2

M

Magnetic deviation 11-3
Maintenance
  preventive 12-1
  replacement of batteries 12-8
  replacement of fuse 12-7
Marks
  changing color of past-entered marks 3-3
  changing current color 3-2
  changing shape of past-entered marks 3-3
  deleting all 3-4
  deleting by cursor 3-4
  deleting specific 3-4
  entering at own ship's position 3-1
  entering by cursor 3-1
  entering by latitude and longitude 3-1
  external event mark 3-5
  number of marks used 11-13
  size 11-18
  target mark 3-5
Memory
  apportioning 11-12
  capacity 11-10
  clearing 12-12
Memory cards 9-1–9-6
  adding track, marks, lines 9-6
  battery replacement 12-8
  deleting files 9-6
  deleting track, marks, lines 9-6
  formatting 9-1
  playing back data 9-4
  playing back initial settings 9-5
  saving data 9-2
  saving initial settings 9-5
Memory, I/O port test 12-2
MENU key 1-14
Menu tree viii

N

NAV DATA key 1-13
Navaid selection 11-15
Navigation data display 7-4

O

Operational status icons 1-17
Own ship marker
  centering 1-5
  size 11-18

P

PLOT key 1-13
Plot mode displays 1-18
POWER switch 1-3
Preferred settings 11-10
Program version no. 12-9

R

Range and bearing calculation
  by latitude and longitude 11-8, 11-9
  by waypoint numbers 11-9
Range unit 11-18
ROUTE key 5-3
Routes
  calculation of TTG 5-9
  cancelling route navigation 5-8
  connecting/disconnecting lines connecting route points 11-18
  creating by cursor 5-4
  creating through route list 5-2
  creating with previously registered waypoints 5-3
  deleting all route waypoints 5-8
  deleting specific route waypoints 5-7
  following 5-5
  temporarily deselecting route waypoints 5-6

S

Satellite selection/deselection 10-5
Ship's speed alarm 6-4
Smoothing 11-14
System configuration ix

T

Target mark 3-5
Time mark 11-18
Time setting 1-20
Track
  appearance 2-2
  changing color 2-2
  deleting all 2-5
  deleting by color 2-4
  deleting by cursor, box cursor 2-4
  hold function customization 2-8
  number of track points used 11-13
  plotting interval by time 2-7
  stopping recording 2-1
  width 11-18
Trackball 1-4
Troubleshooting table 12-10

V

Video pilot display 7-1–7-3
VIDEO PILOT key 1-13

W

Waypoints
cancelling destination waypoint thru keyboard 4-12
cancelling destination waypoint thru menu 4-12
comments 4-5
deleting by cursor 4-7
deleting external waypoint 4-8
deleting through waypoint list 4-8
entering at own ship's position 4-4
entering by cursor 4-3
entering by latitude and longitude 4-2
entering by navigation aid 4-5
entering by range and bearing 4-4
setting destination waypoint by cursor 4-8
setting destination waypoint by range and bearing 4-9
setting destination waypoint by waypoint number 4-9
turning on/off all 11-18
turning on/off through the REGISTER WAYPOINT menu 4-6
turning on/off through the waypoint list 4-7

X

XTE alarm 6-3

Z

ZOOM IN, ZOOM OUT keys 1-7

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Declaration of Conformity CE 0560

We FURUNO ELECTRIC CO., LTD.

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(Address)

declare under our sole responsibility that the product

Color GPS plotter Model GP-3300 consisting of Display unit GP-3300, Antenna unit GPA-016 and Electronic chart card (Flush memory card) BN-512HFRF/BN-01MHFRF (Serial No. 3410-0001)

(Model name, serial number)

is in conformity with the essential requirements as described in the Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment (R&TTE Directive) and satisfies all the technical regulations applicable to the product within this Directive

EN 60945: 1997-01 (IEC 60945 Third edition: 1996-11)

(title and/or number and date of issue of the standard(s) or other normative document(s))

For assessment, see

- Statement of Opinion N° 01214008/AA/00 of 12 January 2001 issued by KTL Certification, The Netherlands
- Test report FLI 12-98-016 of 29 July 1998 prepared by Furuno Labotech International Co., Ltd.

On behalf of Furuno Electric Co., Ltd.

Hiroaki Komatsu
Manager,
International Rules and Regulations

(name and signature or equivalent marking of authorized person)

Nishinomiya City, Japan
January 25, 2001

(Place and date of issue)